# THE FAUNA OF BRITISH INDIA,

INCLUDING

## CEYLON AND BURMA.

Published under the authority of the Secretary of State for India in Council

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## DIPTERA BRACHYCERA.

VOL. I.

В¥

E. BRUNETTI.

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET,

OALOUTTA: THACKER, SPINK, & CO. BOMBAY: THACKER & CO., LIMITED.

May, 1920.

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15



PRINTED BY TAYLOR AND BRANCIS, RED LION COURT, FLRET STREET, LONDON,

N20.1

2684

## PREFACE.

Owing to the war, the difficulties of communication, and the loss of ships coming from the East, there has been an unusual delay in the issue of the present volume, and it has unfortunately been found impossible to incorporate in it certain corrections which the author wished to make. Further, owing to the difficulties under which publishers and printers now labour, it was felt by the Editor necessary to publish without further delay.

Another difficulty which has ansen in the preparation of the volume is due to the fact that the MS. ran to a far larger volume than the Indian Government contemplates, and it was therefore reluctantly decided to publish the following families: Stratiomyidæ, Leptidæ, Nemestrinidæ, Cyrtidæ, Bombylidæ, Therevidæ, Scenopinidæ, Mydaidæ, Empidæ, Lonchopteridæ, and Platypezidæ; leaving the remainder, i. e., the families Pipunculidæ, Syrphidæ, Conopidæ, and Oestridæ for a second volume. This proceeding is, I gather, against the wishes of the author, but no other solution of the difficulty appeared possible.

A. E. SHIPLEY.

1st May, 1920.



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### ORDER DIPTERA.

#### SUBORDER BRACHYCERA.

#### INTRODUCTION.

In the first volume devoted to the Diptera in the "Fauna of British India" Series, the two great suborders, Orthorrhapha and Cyclorriapha, into which the order is now generally divided. were sufficiently characterised, and a comparison was also given between the NEMATOGERA and BRACHYCERA, into which the first suborder is subdivided. The earliest writers divided the Diptera into Nemocera and Brachicera, of subordinal rank based mainly on palpal and antennal characters, and not on those of the venation or early stages, this classification finding favour until towards the close of the last century. Nowadays the old series of brachycerous families is split at or near the Longhoffuride, all those from the STRATIONXIDE to that family being included in the ORTHORRHAPHA BRACHLUERA, the remainder, consisting of the PLATYPEZIDÆ, PIPUNCULIDÆ, SYRPHIDÆ, CONOPIDÆ and ŒSTRIDÆ. the enormous family Muscip (sensu latissimo), and the pupipaious Diptera (the last-named forming in themselves a separate group of uncertain rank) constituting the CYCLORRHAPHA. One anomalous family, the Phorida, is by some placed next the Londhopturida in the Orthorrhapha Brachycera, and by others next to the MUSCIDÆ in the Cyclorrhapha.

The formation of groups of higher rank than families has received the attention of many dipterologists of note, and Verrall gives an excellent résumé of Brauer's (1883) and Osten-Sacken's (1896) views. Verrall himself admitted that there were several points in Brauer's tables that were not clear to him and others with which he could not agree, and it may here be observed that Brauer's primary divisions or suborders of Orthorniatha and Cyclorritarna have been criticised as lately as 1907 by Prof. Miall. Verrall, in noting this in a footnote, adds, "I quite agree with this distinguished sayant in considering the two divisions, Orthornatha and Cyclorenapha, at present incomprehensible" (Dec. 1908). I find myself in the same predicament, and, personally, biological affinities notwithstanding, I have an instinctive leaning towards regarding all the families from the STRATIOMYIDE to the MUSCIDE, and the Phoride, as more closely related one to the other than are a certain number of them related

to the NEMATOCERA; in other words, I hesitate to abandon the "old-fashioned" classification of NEMATOCERA and BRACHYCERA, pur et simple, with the PUPIPARA as a third group, either of equal rank with the other two or as a subordinate section of the BRACHYCERA.

The NEMATOGERA and BRACHYGERA are certainly natural divisions, and Osten-Sacken believed that the characters distinguishing them were of more fundamental importance than those separating the ORTHORRHAPHA and CYCLORRHAPHA; he regarded them as of equal ordinal rank with the CYCLORNIAPHA. Williston, on the other hand, considers there is "no distinct limitation between the Nemocora and Brachycera," \* but, according to Verrall, the shape of the anal cell provides an infallible character in all those cases in which doubt could possibly arise. It is quite evident, however, that these two groups have always been perfectly clear to most dipterologists from the fact that no dispute has ever arisen as to the group to which any particular family belonged; whilst, on the other hand, authors are by no means in agreement as to where the ORTHORRHAPHA NEMATOCERA end and the Brachyonna, in the restricted sense, begin ever, these questions of biological affinities amongst the higher divisions can only be approached by those possessing an intimate knowledge of all the families, and it would be out of place to attempt any discussion of the subject in a work restricted to the consideration of a limited number of families.

For the purposes of the present work it will be sufficient to give, in abbreviated and slightly modified form, Brauer's divisions of his Cyclorrapha:—

 Head not flattened, more or less hemispherical, placed perpendicularly to longitudinal axis of body, mouth placed below. Eyes always present. Dorsal and ventral segments of abdomen well developed, the connecting membrane concealed. Imagines hving free, non-parasitic.... Head flattened, placed in longitudinal axis of body, mouth similarly placed, projecting forward. Eyes

PUPIPARA.

8.

<sup>\*</sup> Manual N. Amer. Dipt. 3rd ed. p. 59.

the lunule a usually runn of face, usu rating the cl	e-seam semicircular, form distinctly margined uping steeply downwards or ally separated and distincted and distincted and fowls at the sidy short and often subequa	right arch, ver middle ictly sepa- les. Anal	
with 2nd bas	al cell	· · · · · · ·	EUMYIDÆ
3. First posterior	cell always closed Ve	na spuna	Syrphid.m
First posterior	cell always open Ve	na spuria	4
4. Arista terminal			PLATYPEZIDÆ PIPUNOULIDÆ

The two latter families were left in the same divisional group by Brauer, but are easily separated by the character given above. It must be confessed that the table of groups is difficult to put to practical use, especially by a beginner. The Eumyide, unfortunately given a family termination, is a combination of the CONORIDE, CESTRIDE, and MUSCIDE, all of which are regarded in the present volume as good and separate families.

The PUPIPARA, it is understood, consist of three distinct

families, Hippoboscide, Nyoteribiide, and Streblide.

The superfamilies herein admitted are those recognised by Verrall in his second published volume on British Diptera, and the following table of them is wholly drawn from that work —

#### Table of Superfamilies

1 Three equally well-developed pad-like pulvilli. Species absolutely elemochictous (i e, strong bristles on head and thorax entirely absent).

Two pad-like pulvilli only, the empodium being sometimes absent or sometimes represented by a bristly hair. Species not truly eremochietous...

2. Basal cells long, the anal cell being open or long and pointed, because the branches of the 5th vein only gradually diverge, and the upper branch is usually connected with the discal cell by the posterior cross-vein, though sometimes (Bomby-Liide, Schnofinder, though sometimes (Bomby-Liide, Schnofinder, though sometimes lower margin of the discal cell; wing-venation usually elaborate Cephalic bristles on froms and vertex not strongly developed, though sometimes visible in Asilder. Often large or very large species and seldom small, and when small usually with long pubescence among the stronger bristles.

Anal cell short except in a few EMPIDÆ (HYBOTINÆ) and shorter than the preceding basal cell (when that is present), and the upper basal cell rather long in the EMPIDÆ only; oth vein with its lower branch recurrent (except in the HYBOTINÆ) and its upper branch quickly lost

EREMOCHÆTA.

4.

3,

in the 4th vein, 3rd vein simple except in a few EMPIDÆ, posterior cross-vein quite absent, posterior cells appaiently never more than four, but usually less, wing-veins altogether few and simple; alula obsolete Face bare or only slightly pubescent in the MICROPHONA, but with peristomal bristles in LONGHOPTERIDÆ and side or genal bristles in PUORIDÆ, but with no face beard or pubescence as in ASILIDÆ Cephalic bristles usually strongly developed. Species always small and distinctly cheetophorous

3. Aerial species, almost always clothed with dense furry pubescence. Legs thin and only suitable for alighting, and consequently aimed with little more than spicules (not true bristles) on the femora and tibine. Eyes nearly always touching in the 3 (holoptic) and never bulged out because of a sunken vertex.

Pedestrian species, usually armed with strong bristles and only occasionally (Laphy in, Isopagon, etc.) clothed with dense coarse pubescence, or (Dra-MATINA) bare of both pubescence and bristles. Legs strong, usually armed with strong bristles on at least the tibue and tarsi. Eves almost

on at least the thire and tars. Eyes almost always widely separated in both sexes (dichoptic), and frequently bulging out because of the deeply sunken vertex

4 Eremochatous species in the sense that there are no strong bustles on any part of the thorax or scutellum

Chetophorous species in the sense that there are strong and usually numerous bristles on the thorax, scutellum, and legs, or at least on the sides of the metanotum, except in the few cases in which dense coarse pubescence is substituted.

5. Wing-veins (including cross-veins) fairly normal, or else the 2nd and 3nd veins extended almost to the wing-tip Antenno with three (or rarely two) joints obvious, besides any style or arista...

Wing-veins extremely abnormal and quite distinct from those of any other Diptera (except Aspectes in the Bibionide); anterior veins up to the 3rd vein strong and conspicuous, running into the basal half of the costs, but the subsequent veins very faint and incomplete and abnormally directed, 4th, 5th, and anal veins very difficult to trace Palpi porrect, not jointed. Eyes widely and equally separated in both sexes. Antennæ apparently composed of one large joint, which bears a very long apical or dorsal arists. Hind legs long and the femora flattened

Wing rounded at the tip, venation fairly normal, with the 2nd vein ending considerably before the wing-tip, and with at least one apparent cross-vein well out towards the middle of the wing, causing the discal cell to be present even if

5.

TROMOPTERA.

ι.

DERMATINA.

ENERGOPODA

G.

HYPOCERA.

extended back to the wing-base. Face, mouthmargin, and jowls without strong bristles. Thorax raiely with a soft pubescence Eyes of the d sometimes touching or approximated.

Imagines always predaceous

Wings pointed at the tip, venation abnormal, as the 2nd and 3rd veins end close together almost at the wing-tip, no obvious cross-vein, and the discal cell absent or reduced to a short middle basal cell Face with strong bristles round the mouth-margin Thorax with bristles but no pubescence. Eyes widely and equally separated in both sexes Antenne short and porrect, with a long subdorsal ansta Colour always dull yellowish, brownish, or greyish, but never green or metallic . ....

MICROPHONA.

ACROPTERA.

Verrall incorporates in the above table the sixteen families of Brachyonna which occur in Britain, as well as the seven superfamilies, which accounts for characters of minor value often being added, but it has seemed better to give his actual diagnoses of the higher groups in full than to attempt to abbreviate them. One or two terms in the venation and so on are changed for the purpose of preserving uniformity with my previous volume. (pp. 14 to 30) is illustrated with typical figures and is a veritable epitome of the salient characters of the Brachycera.

Coming to families, there has been less difference of opinion amongst authors than as regards the higher groups, probably because the characters are drawn solely from the perfect insects. The exact rank of the Conomyide and Xylophagide as families has been questioned, and the affinities of the Longitofrance and PHORIDE have given rise to considerable discussion. Notes on these points will be found under the respective family headings. I follow Osten-Sacken and Verrall in placing the XYLOMYINÆ subfamily of XYLOPHAGIDE in the STRATIOMYIDE, and the remaining subtamily, the XYLOPHAGINE, in the LEPTIDE, to which family also the CONOMYIDE are referred as a subfamily.

Some authors have desired to remove the MYOPINA: subfamily from the CONORIDE to the MUSCIDE and also to disband the ESTRIDE altogether and spread the genera amongst the Muscide,

but with these views I cannot concur.

Of two other families the taxonomic rank has been occasionally disputed, the ACANTHOMBRIDE and APIOCERIDE, but as neither group occurs in the Orient they need not be discussed here. The former family contains the most gigantic flies known, so far as bulk goes, measuring up to 40 millimetres in length and 80 millimetres in expanse of the wings, and they are confined to the Neotropical Region. They are allied to the STRATIOMYIDE, LEPTIDE, and TABANIDE. The APIOCERIDE are akin to both the MYDAIDE and ASILIDE. Both these groups are now admitted to be of family rank.

## Table of all Families of Diptera except the NEMATOCERA.

1. Body not of leathery texture Head free, mouth generally well developed, with a more or less prominent proboscis. Two palpi and at least two oral bristles present Feniora approximate at base. Abdomen distinctly segmented. Oviparous or larviparous, in perfect state never parasitic on warm-blooded creatures.	2.
Body of leathery texture Head placed in a curved excavation of the thorax or bent back upon the thorax Mouth very imporfect; palpi absent. Abdomen indistinctly segmented Femora at base remote, through the broad mesothorax, claws well developed Parasitic during pupal and imaginal stages in warm-blooded creatures (mammals	
and birds).	23.
2. Three distinct pulvilli Absolutely eremo- chetous species (z. e, no strong bristles on	
head or thorax as compared with pubes-	
cence)	3.
Two pulvilli (sometimes obsolete or absent) * Species not truly eremochetous, and often	
with dense furry pubescence, or bristly	8.
3. Third antennal joint annulated. Eyes in o	
normally contiguous or very approximate	
(except in most NEMNSTRINIDÆ); in Ω	4
wide apart Third antennal joint not annulated (except	4.
XYLOPHAGINÆ). Eyes in o generally	
contiguous	7.
4. Posterior cells not parallel with hind margin	
of wing † "Diagonal" vem never present	_
Eyes in a normally contiguous	5
Posterior cells parallel with hind margin of wing. "Diagonal" vein generally present,	
wings often reticulate Eyes in o gene-	
rally separated	Nemestrinidæ,
5. Tibic with at least middle pair spurred	[p. 114.
(indistinctly in Adanthomeridae) Veins	
not crowded together in anterior part of wing Ambient vein present (thin in	
ACANTHOMERIDAE) Scutellum unspined.	6.
Tibio without spurs (except in Xylonyini)	* *
and some Brinna) Veins crowded to-	
gether anteriorly (except XYLOMYINA	
and Bering) Ambient vein absent or	

<sup>\*</sup> Middle one sometimes shorter in Nemeralizate, but always pad-like.
† Some Centina form exceptions, but the enormous thoracic squames, globular bodies, and general appearance of this family at once distinguish them.

incomplete. Scutellum often with two or four (rarely six or eight) spines on margin. Stratiomyidæ, [p 17. 6. Antenne flagelliform. Fourth posterior cell closed. Wing with marginal space of last submarginal cell at most twice that of immediately adjoining cells. Squamæ almost obsolete. Perfect meects never Acanthomeridæ. blood-suckers Antenno normally sickle-shaped, rarely flagelliform or otherwise formed. Fourth posterior cell nearly always open. Wing with marginal space of last submarginal cell at least three or four times that of immediately adjoining cells. Squame very large. Adult females always blood-Tabanıdæ. suckers . . . . . 7 Posterior tibiæ always spurred. Body generally elongate, abdomen never balloon-like Eyes in o contiguous, in Q wide apart, head of normal size and shape Thoracic squame normal Venation as in Taba-NIDÆ, except that the anal cell is sometimes open ..... Leptidæ, p. 100. All tibies unspuired or with very short blunt Body short, rounded; abdomen calloon-like Eyes in both seves ones. often balloon-like contiguous, head very small, inconspi-cuous, depressed, nearly all eyes. Thoracic squamme enormous. Venation eccentric and complex Cyrtidæ, p. 157 8. Basal cells long, at least one-third the length of the wing. Anal cell (sometimes called the third basal) open, or long and pointed. Basal cells short (except in Hyborin. E). Anal cell shorter than preceding cell, when that is present. Third vein never forked, except in some Empinæ 18. 9 Posterior cells parallel with hind margin of wing. Second longitudinal vein (and sometimes upper branch of third also) ending in first longitudinal near its tip Antennie generally clavate at tip. Lyes in o distinctly separated ..... Mydaidæ, p. 314 of wing. Second longitudinal vein ending in first only in Aprocention and some ASILIDÆ; in all other families ending in wing-margin. Antennæ not clavate at tip. Eyes in of contiguous or well separated .... 10 10 Upper branch of 4th vein ending before wing-tip 11. ...... Upper branch of 4th voin ending below 12 wing-tip 11. Venation more complex. Five posterior cells, the 4th closed. Eyes in d always wide

never receiving others in it. Species quite destitute of bristles or pubescence	
12. Five posterior cells Cheetophorous species, generally very pubescent also	
Three or four posterior cells Eremochetous species, except Bombylindæ and some Synphide.  13 Vertex of head deeply sunken between the eyes, leaving the latter very prominent. Eyes in 3 always separated	
Three or four posterior cells Eremochætous species, except Bombylidæ and some Synphidæ	թ. 310.
species, except Bombylidæ and some Syrphidæ	
13 Vertex of head deeply sunken between the eyes, leaving the latter very prominent.  Eyes in 3 always separated	
eyes, leaving the latter very prominent.  Eyes in 3 always separated	
Eyes in & always separated Asilidæ.  Vertex not sunken, therefore eyes not prominent. Eyes in & contiguous or closely approximate	
Vertex not sunken, therefore eyes not prominent. Eyes in a contiguous or closely approximate	
minent. Eyes in 3 contiguous or closely approximate	
14. Third longitudinal vein generally forked Posterior cross-vein absent. Eyes in o normally contiguous in typical groups, but distinctly separated in ANTHRACINA, con- tiguous in both sexes in Systropus. Often densely furry species	
Posterior cross-vein absent. Eyes in of normally contiguous in typical groups, but distinctly separated in Anthra Oinza, contiguous in both sexes in Systropus. Often densely furry species	. 295.
normally contiguous in typical groups, but distinctly separated in Anthragina. Contiguous in both sexes in Systropus. Often densely furry species	
distinctly separated in ANTHRAGINÆ, contiguous in both sexes in Systropus. Often densely furry species	
densely furry species	
Third longitudinal vein never forked Pos-	
	p 173.
101101 Group town Proposite 17,00 In O COM-	
tiguous or approximate, except rarely, but	
in Conordze wide apart in both sexes.	
Normally not densely furry species, except	
in some Syrphids	
terior cell closed, antenna with apical	
style (CONOPINE), or first posterior cell	
open; antenna with dorsal arista	
(MYOPINE) Conopides.	
Proboscis soft. First posterior cell closed or open. Antenna of very various formation. 16.	
16. First posterior cell closed. Vena spuria pre-	
sent (sometimes very faint). Eves in hoth	
sexes of normal size and nature Syrphide.	
First posterior cell open. Vena spuria absent. Eyes in both sexes very large (especially	
in Prounculian); some of the facets	
often enormously enlarged	
17. Arista dorsal, 3rd longitudinal vein well	
curved; * apical section of 4th vein curved	
downwards; hind tarsi never dilated Pipunculidæ. Ansta apical, 3rd vein nearly straight; apical	
section of 4th vein curved inwaids. Hind	
tarsi dilated	
18. Venation abnormal;† no obvious cross-ven	

<sup>\*</sup> Nearly straight in *Chalarus*.
† Except in *Opetia*, a non-Oriental genus.

Eyes in both well out on disc of wing sexes wide apart ..... Venation fairly normal (reduced in Dolioho-PODIDE), at least one obvious cross-vein well out on disc of wing. Eyes in & contiguous, approximate, or wide apart . 20. 19. Second and third longitudinal veins long, nearly parallel. Wings long, tips pointed, venation different in the sexes; no wingless species Lonchopteridæ .... Second and third veins united in one rather [p. 387. short strong vein Wings short, tips well rounded, venation similar in both sexes, some species wingles-Phoridæ. 20 Discal cell united to 2nd basal cell, basal cells very short or obsolete. Third longitudinal vein diverging from a swelling near base of wing, anterior cross-vein at same spot, third vein never forked Pro-boscis soft Arista or style dorsal or apical Abdomen normally 5- or 6-segmented Dolichopodidæ, Discal and second basal cells separate (except m a few Empidæ) Basal cells generally long enough to be obvious. Second and third veins diverging well away from base of wing, third vein not forked, except in some Empidas Proboscis rigid or soft  $^{21}$ 21 Antennal style present or absent, arista, if present, generally dorsal. Proboscus geneially rigid, pointed. Abdomen normally 7-segmented. Second and third longitudinal veins diverging at one-third of the wing, third vein often forked Empidæ, p. 321. ....... Antennal style never present, arista, when present, nearly always dorsal. Third vein never forked ..... . . . . . 22. 22 Proboscis rudimentary, palpi rudimentary or absent. In larval stage always parasitic Œstridæ. on mammalia Proboscis and palpi always distinctly pre-In larval stage rarely parasitic on mammalia Muscidæ (s. latiss.). 23. Head folding back on doisum of thorax. Wingless species. Parasitic on bats Nycteribiidæ, Head not folding back on thorax. Winged or wingless species. Parasitic on birds and 24. parallel veins, cross-veins often present. Claws simple Nearly all the species Streblidæ. when present, with veins crowded together anteriorly; cross-veius short and near base Claws large. Parasitic on of wing. mammals and birds.,.... Hippoboscidæ.

The external characters of the Brachyoera and Cyclorrhapha exhibit as much, it not greater variation than those of the Nematogera. As the introduction to the previous volume on Diptera dealt with characters common to the order generally, those pages may be consulted in conjunction with the present summary, which is confined to the Brachyoera and those families of the Cyclorrhapha treated of herein

The eyes in the higher Braonycera and higher Cyclorenapha are generally contiguous or subcontiguous above in the male, and such flies are said to be holoptic, the eyes in the female being distinctly separated by a comparatively broad from, but exceptions are numerous Diptera in which the eyes are well separated in the d are called dichoptic. The CYNTIDE have contiguous eyes in both sexes (with rare exceptions), and in some cases the eyes are contiguous both above and below; the MYDAIDE, ASILID L, DOLICHOPODIDE, LONCHOPTERIDE, and CONOPIDE have the eyes equally conspicuously separated in both sexes. The lower Antito-MYINE and practically all the ACALYPTRATA are also dichoptic. The eyes may be pubescent or bare, this being sometimes a sexual character, and in life they are often green (Hamatopota) or golden green (Chrysopolus), and in many species of Tabanida, Asilida and some other groups bear brown or purple bands. In many groups the front facets are from just perceptibly to very considerably larger than the rest in the o, and of uniform and smaller size in the 2, but in the Pipunculible the front facets, though enlarged more than usual in the d, are yet more enlarged, and to an enormous extent, in the Q. In some Purifara the eyes are absent; in Cyrridic and Pirunoulida they occupy practically all the head, no other parts except the antennæ being visible in profile in some species of both families.

Three ocelli are normally present in all the Brachycera, but

they are occasionally absent (CONOPINE).

The lower part of the head, or epistome, exhibits a wide range of shape and size, from being barely or not at all produced beyond the eyes in profile either forwards or downwards (as in most Pipunoulide) to forming a long strong conical rostrum (Nemotelus in Stratiomyide, Rhingia, Folucella, Lycastris in Syrphide). The face frequently has a central bump, as in most Syrphide, or it may be less prominent, gently curved, or flattened. The mouthparts attain their highest development in the Tabanide, a family in which the females of all the species have the reputation of being blood-suckers. The parts of the female Tabanid mouth consist of the labium or lower lip, a pair of maxille and of mandibles, strong piercing organs, and a pair of large, fleshy, conspicuous, approximately conical maxillary palpi.\* The probosis in the Brachtofera is usually soft, and formed for sucking the juices of plants or animal matter, but it is not infrequently of enormous length, longer than the whole body and of extreme

<sup>\*</sup> Compare 'Indian Diptera,' 1, p. 18,

slenderness, and in this state either adapted for piercing the skin (Pangonia) or for imbibing the juices of flowers (NEMESTRINIDE, CYRTIDE, and many BOMBYLIDE). Occasionally it is long, rigid, and geniculate (CONOPIDE). Biting flies are distributed throughout many brachycerous and cyclorrhaphous Symphoromyia, in LEPTIDE, has been definitely proved to bite man severely on occasions; the Tabania generally confine their unwelcome attentions to the larger mammals, though one genus, Hamatopota, widely distributed throughout the world, its natural home being apparently Africa, is very prone to attack man. The strong horizontal horny proboses of the Stomonys group of true Muscinids is well known, as are also the tsetse-flies (Glossma) inhabiting Africa, these being the carriers of sleepingsickness. Philematomyu, a genus of Museinid flies, possesses a circlet of teeth-like projections at the tip of the proboscis with which, even if unable actually to pierce the skin, it can easily enlarge an abrasion already made. The proboscis in not a few genera is rudimentary, in some almost obsolete, as in Cerrio.r. the members of which family cause cattle instinctively the greatest terror on their approach for the purpose of depositing their eggs on the animals' mouths, nostrils, etc. An isolated case occurs here and there of a genus with a strong rigid proboscis in a group in which the organ is normally soft and fleshy, as Drymeia in the Anthonyme. The Asilida and Empida are two other extensive families generally possessing a rigid horny proboscis, with which they easily pierce and carry off their prey, consisting of softer Diptera and other insects. The labella, sometimes called "suckerflaps," vary in size, shape, and strength, sometimes being small and soft, in other cases acting as organs of attrition to rub off small particles of food.

The palpi, apart from those of the Nematocera, consist usually of two joints, in some highly specialized families of one only, these being the maxillary pair, the labial palpi being considered to be absent in the Diptera. Though large and prominent in some families (Tabanide), it is often difficult in others (Bomerlier, Therevide, Asilde) to examine them without removing the dense furry or bristly pubescence characterising these groups. However, in most of the Brachyoma the location of any genus or species can be readily ascertained without reference to these organs. They are normally porrect, i. e., directed horizontally forwards, especially in the blood-sucking Muscids, but frequently project more or less downwards, and they may be present or absent, respectively, in genera of considerable affinity, whilst in the Cyrtide they are generally obsolete.

As regards the antennæ, a gradual change takes place from the many-jointed elongate flagellum of the Numarocena to the compact three-jointed form of the bulk of the remainder of the Diptera, the 3rd joint often being the only conspicuous one.\* In the

<sup>\*</sup> For comparative notes on the antenno in Nematocera and Brachycena, see 'Indian Diptera,' 1 p. 20.

earlier families of the Brachyodra (Stration vide, Tabanide, some Leptide, etc.) the third joint is usually annulated, that is, family separated by more or less distinctly impressed lines into several divisions, generally eight or five, and in this character considerable resemblance is apparent to the nematocerous families Bibtonide, Simulaide, and Rhyphide. These annulations in subsequent families of Brachyodra gradually disappear in an obviously single elongate joint, as in many Bombulide, Therevide, and Abilide, with or without a more or less distinct one-or two-jointed apical style; and in later families still, the 3rd joint is further shortened and may bear either a style or arista.

The arista, the bristle-like hair situated on the upper side of the 3rd joint, makes its appearance in the very first brachycerous family, the STRATIONYIDE,\* and is present in one or more genera in probably all the subsequent families, with a few exceptions (TABANIDE, ACANTHOMERIDE, SORNOPINIDE, MYDAIDE, and APIO-OBRIDE), and of these, all except the first are groups of quite The arista is at first (STRATIOMYIDE, LEPTIDE) limited extent mainly apical or subapical, afterwards either apical or dorsal in the same family, and, finally, mainly dorsal (Dollonoronine), which is its normal nature in the remaining brachycerous families and in the Cyclorrhapha. The arista may be quite bare, pubescent to a varying degree, or conspicuously plumose. In the great majority of Brachyonra the two basal antennal joints are differentiated from the 3rd in the nature of the scapal joints in Numatocura, and are usually short, bearing short bristles, cylindrical or, especially the 2nd, more or less cup-shaped; but in the 3rd joint the most varied forms exist even in a single family, this being especially the case in the STRATIONYIDE, BOMBYLIDE, and STRPHIDE. Briefly, the 3rd joint may be elongate-cylindrical (annulated or not), strapshaped, filitorm, tapering, conical, tooth-shaped, oblong, rounded, oyal, reniform, globular, or of irregular shape. In one aberrant genus (Rhachiceius in LEPTIDE) it is strikingly pectinate, recalling Pselhophora in the NEMATOCERA, whilst in Talarocera, a genus of North American Tachinids, the 3rd joint in the female is of an extraordinarily fantastic shape. In the Cyclorunarila the two basal joints are normally as in the Bradityokka, though the 3rd joint again shows the same extreme range of variety in the two largest families, Syrphide and Musoide, but remains of remarkably uniform, though peculiarly characteristic, form in others (Pipunoulidæ, Platypezidæ). In these groups it may bear a short style or an arista. The 1st and 2nd antennal joints sometimes depart from their more or less general form, the former being exceedingly long and cylindrical in Systropus and conspicuously so in Stratiomyia, the 2nd showing unusual development in certain genera.

Coming to venation, it will be observed that in the BRACHYCERA

<sup>\*</sup> The only nematocerous family in which the arista appears is the Ordinarinian, a group of about half a dozen species, and as it consists of several joints it is perhaps not truly identical.

several characters adopt nearly the opposite form to that in the NEMATOGERA. Of these perhaps the puncipal is the anal cell, which is always wide open in the NEMATOCERA, normally widening towards its tip, whereas in the Brachyomra it normally contracts towards its tip, frequently very strikingly so, and in a large number of genera it is completely closed more or less near the wing-margin, either by the gradual approximation of the 5th and 6th veins or by the lower branch of the former turning down, frequently at a sharp angle or well-rounded curve, often in the latter cases closing the cell some distance from the maigin of the In the higher families of Bracityoera the anal cell is very elongate, extending generally to the wing-margin, but in subsequent families, notably the Empide, it is considerably shortened through the almost or quite recurrent ending of the lower branch of the 5th vein in the analyein at or before the middle of the latter, whilst in Dolichorodide and Lonchoffering it is shorter It increases in length again in two out of the three first families of the Cyclorriapila, though it is short in one of them (PLATYPEZIDE), whilst in the higher Muscids it is always comparatively short, and in the lower Muscions normally short or absent, although conspicuous exceptions occur (some Ortalina and TRYPETINE, for example). In the CONOPIDE, one of the two tamilies\* that may be regarded as forming the transition from the Brachycera-like Cyclorriapha to the Muscipe (s latiss.) it is long in the Conoring and short in the Myoring, which tends to prove the intermediate nature of the Conorida.

The auxiliary and 1st vein are generally obviously present, separate and simple, but in some groups of Acalyptrata they are trequently coalescent. † The 2nd vein is nearly always very prominent and simple; the 3rd, which is nearly always simple in NEMATOCERA, is normally forked in the higher families of Brachy-The 4th and 5th veins in these latter families are generally both forked, but in the highest three families of the Cyclorriania (PLATYPEZIDE, PIPUNOULIDE, and SYRPHIDE) there are normally only three endings to the two veins, in which cases it is the 5th vein that is considered forked, its upper branch forming part or the whole of the hinder side of the discal cell. This cell in the NEMATOCERA is confined to the Tipulida and Rhyphida—that is to say, the two families generally placed next to the Brach compan, in which latter the cell is a standard feature, though exceptions occur (some EMPIDAE), -and it is prominently retained in the calvotrate Muscids and the bulk of the ACALYPTRATA. anterior cross-vein is nearly always present, though rudimentary in some STRATIONYIDE; but the posterior cross-vein disappears after the higher families are passed, if the theory of the forked 5th vein be upheld.

<sup>\*</sup> The other being the Œstring.

<sup>†</sup> They are then called the 1st vein, following Schiner

<sup>‡</sup> It may as well be stated here that I am by no means convinced that this is the correct interprotation.

The brachycerous venation attains its most perfect form perhaps in the Tabanide, and it is elaborated most in the Asilide, Nembertrinide, Mydaide, and Cyrtide (despite the latter family also exhibiting some very simple venational types), being quite eccentric in the last three families, many of the longitudinal veins in the hinder part of the wing running more or less parallel to the hind maight, whilst in certain genera of Nembertrinide an additional character is the net-like system of very numerous small cross-veins. An isolated instance of a cell being subdivided by numerous cross-veins occurs in Lycastris (Syrphide), in which the subcostal cell is so divided.

After the Brachtoera the venation becomes more simplified, and is, speaking broadly, remarkably uniform in type throughout the Muscide, in the higher groups of which (Tachinids, Deands, Sarcophagids, and Muscinids) the 1st posterior cell is quite or nearly closed by the upturned apical section of the 4th vein, whilst in the Anthometine and the various subfamilies forming the Acalyptrata that cell is broadly open. Numerous minor differences occur in these groups, but the type of venation remains the same. Passing on to the Pupipara, some genera may be observed to possess peculiar venation, but they need not be discussed here

The general form of the body exhibits the widest diversity. The head may be variously proportioned to the body, perhaps attaining its minimum of size in the Certific and its maximum in Pipunculide, but normally it is approximately of the same width as the thorax and usually more or less semicircular. The thorax and abdomen both vary greatly in length and breadth in relation to one another, and range from the flattened form in some STRATIONXIDE to the humped thorax in many Euride and to the globular or balloon-like abdomen in most CYRTIDE, the whole body in many species of the latter family being practically As regards vestiture, a short pubescence over the greater part of the thorax and abdomen is common to the vast majority of genera in Brachycera, a few restricted groups being for all practical purposes absolutely bare (Scenopinus). The earlier families are eremochotous—that is, possess no distinct bristles of a chætotactic nature on the head or thorax; but such bristles gradually appear in successive families, as witnessed by the apical spurs on the tibiæ in LEPTIDE, spicules or stick-like spines on the legs in some BOMBYLIIDE, and real bristles and spines in that family, in Dolichopodide, Empide, and Therevide, culminating in the powerful chætotactic system in most Asilina; after which these characters gradually diminish or practically disappear (as in PIPUNCULIDE and SYRPHIDE), reappearing and attaining probably their greatest development in the order in the Tachining, the highest group of the Muscine (s. latiss.) The pubescence, always soft in STRATIOMYIDE, attains its greatest development perhaps in Bombyllide, Therevide, and Asilide; and true scales, covering sometimes extensive parts of the body or legs, are common in many genera of BOMBYLIIDE and THEREVIDE

The vestiture of the legs varies from practical bareness, through the whole gamut of soft and fine to a long and ragged pubescence, bristles, spines, scales, and tooth-like serrations (the latter generally confined to the underside of the femora), all of them often forming good generic or specific characters As a rule, aerial species (that is, those that are frequently on the wing and addicted to hovering) possess soft pubescence on the body and weak legs devoid of strong bristles, as they are presumably employed mainly for alighting, whereas, on the contrary, pedestrian (which frequently means predatory) species mostly possess strong bristles or spines, and powerful legs capable of running swiftly and surely and ot holding their prey when captured, and possessing comparatively reduced powers of flight Compare, for instance, a Bombylius with an average Asilid. A peculiar character called "touch hairs" is present in certain genera of Luptide, Tabanide, and some other widely divergent groups, and this is dealt with under the genus Lentis.\*

The generalia in the BRACHYCERA are usually more or less concented in most families or are of simple form, but they afford in the  $\sigma$  good taxonomic characters in ASILIEE and DOLIGIOFODIES, being fully free in the latter family; but the generalia are always more uniform in the  $\varphi$  and of little value for classification in

that sex

### Life Histories +

Although the metamorphoses of the Diplera in general are still but imperfectly understood, considerable progress in their study has been made since the older writers (Réaumiir, De Geer, etc.) first broke the ice, and the early stages of a comparatively large number of common species have been worked out. Taking the order as a whole, the larva may be described as maggot-like, though extreme forms of shape are far from uncommon. generally consists of a head segment and twelve others, of which the three anterior ones are presumed to represent the thorax of the perfect insect. The head segment is often so indefinitely presented that Braner sometimes uses the expressions "head capsule" and "jaw capsule" Even when obviously present the head is sometimes most disproportionately minute or placed below the anterior end of the body so as to be invisible from above: also not infrequently in the flesh-feeding maggets no head can be detected with certainty These latter forms are called acephalous,

\* These notes on vestiture are compiled chiefly from Verrall

t These remarks on the early slages are wholly culled from Dr. Sharp's paper (v Verrall, p 31) This article should certainly be studied by all interested in the subject. In addition to a preliminary general resume of brachycerous larves, it offers a translation of Braner's classification of the families in Brachyceron based on larval characters, and, lastly, more detailed information is given on each family or group of families separately.

whilst at the other end of the scale, i e., those larve with unduly large heads, the term eucephalous is applied The eucephalous kinds are the less common, but they are the normal form in the nematocerous family CULICIDE The head in the larve of the majority of brachycerous families exhibits an intermediate type between the extreme forms. Many kinds of larve have retractile heads, the front part being completely withdrawable inside the following segment or segments.

Regarding the mouth-parts Brauer, roughly speaking, described the larvæ of the NEMATOCERA as having the laws moving houzontally, except in cases where the mouth-parts are quite rudimentary, when the larva is peripneustic and 13-segmented. He claims for the BRACHYCERA vertically moving jaws-sucking and boring groups coming also under this division, the head being not well developed. Brachycerous larvæ with rudimentary mouthparts are amphipmenstic or metaphenstic, with ten to twelve obvious segments.

The number of body-segments is frequently by no means easy to ascertain, Dr. Sharp stating that there is "no morphological criterion yet discovered by which the segments can be numbered " In some cases, of course, they are obvious enough, whilst in others there are what have been termed intercalary segments, apparently consisting of the undue development of the integument between the orthodox segments, the larve of the THEREVIDE and SCENO-PINIDE being instances in which the apparent number of segments approximates to about twenty. The larva with the smallest number of segments appears to be that of the nematocerous family BLEPHAROCERIDE, in which only five or six are present.

Locomotion is usually effected by means of pseudopods, as jointed legs are unknown through the whole order of the Diptera, these pseudopods being transverse swellings on the under (or sometimes both upper and under) surface of the body, and they may also be furnished with rows of bristles or small wart-like projections, placed on a varying number of segments according to

the species.

The spiracles in Dipterous larvæ consist of a posterior pair placed near or at the tip of the body, where there is often some special development for their protection. Larvæ with only one pair of spiracles, the posterior ones, are called metapneustic, but if in addition there is a pair of anterior ones placed a little behind the head, they are termed amphipmeustic; whilst when intermediate spiracles are also present, making, so to speak, three sets in all, they are known as peripneustic.

The pupa-case is ordinarily the dried larval skin, the imago escaping through a longitudinal split occurring between two transverse splits, normally on the 3rd and 5th segments re-

Further detailed information will be found under the respective families or genera concerned.

## Family STRATIOMYIDÆ

Head hemispherical or flattened, rather short, usually about as broad as thorax, generally bare. Eyes contiguous in o (occasionally very narrowly separated, Sangus, etc.), wide apart in Q, if hairy in d, nearly always bare in Q, sometimes upper facets enlarged in d, all facets equal in Q; posterior orbits often very broad and conspicuous. From seldom prominent, but lower part of head forming a conspicuous snout in some genera (Nemotelus); three distinct ocelli Proboscis usually short and fleshy, sometimes rudimentary, occasionally long and thin (Nemotelus), rarely conspicuous, palpi 1- to 3-jointed, inconspicuous. Antennæ porrect, approximate at base, showing, perhaps, greater diversity of form than in any other family of Diptera, 3-jointed, 3rd joint annulated, forming apparently several (up to eight) annulations, an apical style, often very large, or an apical or subapical arista often present.

Thorax generally quadrangular or roughly oblong or oval, more or less pubescent, moderately or considerably arched; scutellum semicircular or broadened, unarmed or with 2, 4, 6, or 8 spines, occasionally produced into a prominent erect blunt cone or spine (Monacauthomyia, Ceratothyrea). A strong spine on each side of

thorax in some genera (Ephippium, Negritomyia).

Abdomen of five to seven, sometimes eight, segments, of very varied shape, globular, much broader than thorax (Pachygaster, Acanthina, Cyphomym), broader and shorter than thorax (Culena); quadrate (Stratiomym, Odontomym), oblong or oval, and about as long as thorax (Evaza, Tinda, and many others), or very elongate, linear, cylindrical, or flattened (Saryus, Hermetia, Stratiosphecomym). Genital organs usually inconspicuous.

Legs normally of moderate length and strength, or rather weak; destitute of bristles or spines (except for a seriation below hind temora in some XYLOMYINE); generally bare or with pubescence mainly confined to the femora, tibus unspuried, except in

XYLOMYINA and some Burin.E.

Wings generally with the characteristic venation of the family (except Xilomyin and Berine), anterior venus (subcostal, 1si, 2nd, and 3rd longitudinals) crowded together in fore part of wing and the posterior venus very faint, often not reaching wing-margin. In typical genera costa not reaching wing-tip, ambient venu absent; 3rd voin simple or forked, fork occurring at some distance beyond discal cell, both branches ending in costa before wing-tip; discal cell always present, lower side often formed of upper branch of 5th vein, in which case posterior cross-vein absent; anterior cross-vein present, not distally further than middle of discal cell, joining, except in Sargine, 3rd vein to discal cell. In Clithelarine, 2nd vein apparently anastomosed with 3rd or may be considered absent. In Sargine, anterior cross-vein joining prefurca and discal cell, as 2nd vein originates much later than

usual. Præfurca originating in this family about opposite base of discal cell (except in Berink and Xylomyink); whereas in all other families of Beachycera it originates much sooner. In Berink and Xylomyink all the veins attain the wing-margin,\* præfurca quite distinct, costa nearly or quite reaching wing-tip, ambient vein more or less distinct, 4th posterior cell closed in Xylomyink. In all subfamilies, membrane of wing always ribbed or wrinkled; squame variable in size, thoracic pair sometimes absent.

The STEATIOMYIDE are invariably bare of bustles or spines (except the side tholacic spines in a few genera), but often possess dense soft pubescence extending over the whole body and the femora. The crowding together of the anterior veins and the extremely wide variation of form in the antennæ (perhaps greater than in any other family of Diptera) are their principal characters. In the Bering and Xylomying the venation takes the form of the other allied families and the autennæ are more uniformly constructed, elongate or subconical, with distinctly annulated 3rd joint. The family is closely allied to the Leptide and Tabanide and to the small family of gigantic flies, the Acanthomericae, known only from South America.

Life-listory — The larvæ show considerable variation, though easily recognised when once seen, and those of some species are popularly known as rat-tailed maggots, as are also those of the ERISTALINE. They are 12-segmented, including head, hemicephalous or conical, very elongate, rather leathery, and more or less flattened. They live in earth, dung, semi-liquid or decaying matter, and many are aquatic, in the latter case the eggs are laid on plants above the surface of the water. No pseudopods; terminal spiracles not visible, placed wholly inside a chamber which has generally a closed or obscure aperture. Pupa coarctate, in which character this family differs from all other Brachyoera, the image escaping through transverse slits on the 3rd and 5th segment and a longitudinal slit between them

Many species hibernate in North Europe, but very possibly do not do so in the Tropics. The life-histories of several European species are well known. The imagines frequent grass and low herbage in marshy situations and, generally speaking, are sluggish in habits, though some have a very rapid flight in hot sunshine.

## Table of Subfamilies.

- 1. Abdomen of at least seven obvious segments
  Abdomen of five, or at most six, segments
  2. Præfurca beginning at about opposite base of discal cell; 4th posterior cell wide open
  Berings

<sup>\*</sup> Except for an abortive branch of the 4th year in some BERINA

<sup>+</sup> Additional and more detailed information occurs under the various subfamilies or genera concerned.

ŋ	Fourth vein with only two terminations (i.e., only two true veinlets issuing from discal cell, the apparent 3id veinlet being the upper branch of the 5th vein)	[p. 10. Pachygastrinæ,
	cell by the posterior cross-vein being present, or in punctiform contact with that cell when	•
	posterioi cioss-vein is absent	4
4	Anterior cross-very joining preduces to discal cell	SARGINÆ, p. 72
	Auterior cross-ven joining 3rd ven, as usual, to discal cell	5 [p. 56.
<b>5</b>	Posterioi ciosa-vein present	STRATIONAINAD,
	Posterior cross-vein absent	C'LITELLARIINÆ,
		[p 38.

The line of demarcation between the two last subfamilies is very indefinite, and, as more than one author has suggested, they might well be united into a single subfamily. The posterior cross-vein is often a variable quantity even in groups in which it is technically present—for instance, it is absent in *Ptecticus australis*, Sch., though present in the other Indian species. Williston sinks the alleged subfamily Hermetiin in Cuitellariin and his view is adopted here.

#### Subfamily PACHYGASTRINÆ.

Head comparatively small, eyes generally bare, antennæ of very varied form, branched (Ptilocera), elongate (Pinda, etc.) filitorm (Stratiosphecomym), globular (Pachyguster), or of irregular

shape.

Tho ax subquadrate, oval; scutchum unarmed or with two or four marginal spines, sometimes produced upwards or hindwards into a strong blunt cone. Abdomen 5- or 6-segmented, of very varied shape, often exceedingly broad, much broader than thorax, globular, sometimes oval or oblong, or much elongated and more or less cylindrical. Legs comparatively short, slender, smooth. Wings with 3rd vein simple or forked; posterior cross-vein absent through 5th vein forming hinder side of discal cell; 4th vein with only two veinlets. Four posterior cells, united on wing-margin.

The essential character of this subfamily is the presence of only three veins apparently issuing from the discal cell, the lower one being the upper branch of the 5th vein. Mostly bare

врестев.

## Table of Genera.\*

1. Antenno branched .... PTILOCERA, Wied.,
Antenno of various forms, never branched. 2.

<sup>\*</sup> For table of Oriental genera, vide Brunetti, Rec Ind. Mus. 1, p. 89.

2.	Eyes pubescent	Acanthina, Wied, 3. [p. 26]
3	Scutellum unspined, or produced conically	4
	upwards Scutellum 2- or 4-spined, never conically	
4	upturned Abdomen elongate, linear, much longer	8,
	than thorax, antennes conspicuously long, filiform	[Brun., p 36 STRATIOSPHECOMMIA,
	Abdomen very short, thick, rounded, antennal 3rd joint rounded or shortly	
5	elongate, never conspicuously so Third year unforked	5 [p. 21 Zabrachia, Coq,
	Third vein forked	6. [p. 20.
6	Scutellum not upturned Scutellum distinctly comeally upturned	PACHIGASTER, Mg,
7	Antennæ filiform, longer than head Antennal 3rd joint large, round	ACRASPIDHA, Brauel, MONACANTHOMAIA,
8	Scutellum with two very short spines	[Biun., p 23 Wallacea, Dol,
9	Scutellum 4-spined Third antennal joint with elongate style	9 Tinda, Walk, p 29.
	Third autennal joint with pubescent arista	10
10.	Abdomen barely broader than thorax Abdomen much broader than thorax	EVAZA, Walk, p 31 Craspedometopon,
		[Kert, p 28

#### Genus PACHYGASTER, My

Pachygaster, Meigen, Ill Mag 11, p 266 (1803) Vappo, Latreille, Hist Nat Crust Ins xiv, p 343 (1804). Neopachyyaster, Austen, Ent Month. Mag xxxvii, p 245 (1901).

GENOTYPE, Nemotelus atra, Panz, by original designation.

Head semicircular; eyes large, contiguous in d (except in rare instances), practically bare, posterior orbits broad. Proboscis and palpi small and inconspicuous Antenna short, 3id joint rounded. with four indistinct annulations and long subapical pubescent Thorax large, broadened hindwards, transverse suture deep, V-shaped, behind which the surface is somewhat inflated on each side; scutellum subtriangular, unspined Abdomen much broader and barely longer than thorax, subglobular, 5-segmented, genitalia small. Legs simple, nearly baie, femora and metatarsi long. Wings with 1st and 2nd veins short, the latter ending barely beyond middle of costa, 3rd vein normally forked, both branches ending well before wing-tip, discal cell large, 4th vein with only two terminations, posterior cross-vein absent, as 5th vem forms hinder side of discal cell, anal cell closed far from wing-border

Range. Europe, North America, Orient.

Life-listory That of several European species is known. The larva lives in rotting tree-trunks and probably feeds either on the decaying wood or the frass produced by wood-boring Colcoptera.

There is only one Indian species in the restricted genus Pachygaster, namely, P. annulyes, sp. nov. Macquart's P. rufitarsis,\* from Pondichery, cannot belong to this sublamily, as, according to the plate, it possesses three endings to the 4th longitudinal vein, apart from the upper branch of the 5th vein.

#### 1 Pachygaster annulipes, sp. nov.

Q. Head. from between one-third and one-fourth of the head, shining black, face, which is conspicuously invaginated, with greyish dust, back of head shining black. Antenno with 1st joint black, the remainder wholly bright yellow, with long arista. Proboscis dark. Thorax and scutellium shining black, dorsum of both with very short yellowish pubescence, which does not quite extend to the anterior margin of the former. Abdomen shining black, with sparse short pale yellowish pubescence; venter black, with sparser but slightly longer pubescence; venter black, with sparser but slightly longer pubescence. Legs yellowish to tips of tarsi, a rather broad subapical black or blackish brown ring on all the femora. Wings pale yellowish grey, stigma darker yellow, halteres yellowish.

Length, 24 mm.

Described from a single 2 from Marghenta, Assam.

Type in the Indian Museum.

#### Genus ZABRACHIA, Coq

Zabrachia, Coquillett, Bull N Y. State Mus xlvii, p. 585 (1901).

Genotype, Zabrachia polita, Coq. (North America)

Differing from Pachygaster in the unfolked 3rd vein. Some degree of latitude must be allowed in my revised view of this genus, in which the species are chiefly united by the above primary character. Eyes in 3 contiguous (minutesima, Zett, a European species) or narrowly separated (unnulifemur, alhipes) Scutellum not upturned (minutesima), barely upturned and thickened (albipes), or produced upwards into a short blunt cone (unnulifemur) Third antennal joint transversely elliptical (polita, the type-species from New York) or as in Pachygaster.

Range. India, North America

Z. altipes has wholly pale yellow legs, while Z annulifemur has a broad dark band on all the femora.

## 2. Zabrachia albipes, Brun. (Pl. I, figs. 1, 2)

Pachygaster albipes, Brunetti, Rec. Ind Mus i, p 102, Q (1907) Pachygaster infurcata, de Meijere, Tijd. v. Ent. I, p. 232, Q (1907).

Q. Head and front shining black, with a brilliant white streak on each side of lower part of head; antenna and proboscis orange-

<sup>\*</sup> Dipt. Exot. Supp. 1, p. 57, pl. vi, fig. 3 (1846).

yellow Thorax and abdomen shining black, with short, sparse, silvery grey hair, which is a little thicker and mixed with gold hairs on dorsum of thorax, abdomen uniformly black. Legs pale yellowish white, tips of tarsi faintly blackish. Wings quite clear; veins on anterior part and the stigma pale yellowish, halteres white.

Length, 2-24 mm.

Described from four Q Q in the Indian Museum from Calcutta My original description was insufficient, and my not noting the unforked 3rd vein probably prevented de Meijere from recognising my species in his infurcata, described from Java. The white tomentose stripe on the side of the thorax mentioned by de Meijere is present, though liable to be not readily distinguished from the general whitish pubescence of the pleuræ

#### 3. Zabrachia annulifemur, sp. nov

♂ ♀. Head shining black, bare, from at level of antennæ about one-fitth of the head in 3, in 2 one-fourth width of head, sides parallel except near vertex and towards antennæ; visible only from above, a pair of moderate-sized oval silvery-white spots placed lengthwise, nearly contiguous, one above each antenna, tace with broad white-dusted band contiguous to lower inner eye-Antennæ brownish orange, upper side of 3rd joint blackish at tip Thorax, scutellum, and metanotum shining black, all with very short whitish pubescence, scutellum produced upwards into a short blunt cone Abdomen shining black, doisum and venter with similar pubescence to that of thorax, but less obvious, genitalia brownish orange, with a few stiff hans yellowish, front coxe more brownish at base, all femora with a broad blackish ring leaving base broadly, and tips narrowly, pale. Wings colourless, veins and stigma pale yellow, halteres yellowish, clubs shining milk-white.

Length, barely 3 mm

Described from three & & in the Pusa collection (including type sent to British Museum) from Annandale, Simla District, "on leaves," x. 1911; and one Q in the Indian Museum from Simla, 7000 ft, 9 v. 09 (Annandale)

This species must be near the femorata variety of de Meijero's P. infurcata, but should be distinct. In P. albipes the  $\sigma$  trons is one-sixth the width of the head, with practically parallel sides, including the face also, there being only the very slightest widening towards the vertex and towards the mouth-opening. In the Q the frons and face form one-third of the head, being distinctly but slightly broader towards vertex and mouth. In P annulationum,  $\sigma$ , the frons is one-fifth the width of the head with less parallel sides, and in the Q one-fourth. These differences should effectually separate the species and prevent the latter from being confused with the femorata variety of infurcata, Meij

4

#### Genus MONACANTHOMYIA, Brun

Monacanthomyaa, Brunetti, Rec Ind Mus vii, p. 448 (1912)

Genotype, Monacanthomyra annandaler, Brun

Allied to Pachygaster, Mg, from which it differs by the for-

mation of the scutellum, which is produced upwards so as to form a very large conical base, from which it is continued upwards in the form of a long strong spine with blunted tip. It differs from the alhed Acraspulca, Brauer, by the 3rd antennal joint being large and round instead of filterm and longer than the head. The type-species is the only one known.

Range. India



The type- Fig 1 —Monacanthomyra annandalor, Brun, scutellum in profile

#### 4 Monacanthomyia annandalei, Brun.

Monacanthomyna annandalei, Biunetti, Rec Ind Mus vii, p 448 (1912)

J. Head with vertex triangular, elevated, the three ocelli' distinct, reddish, from between one-fourth and one-fifth width of head, nearly linear, shining black, with (seen from above) two small, nearly contiguous, oval, silvery-grey-dusted spots a little above the antenna, eyes with very small uniform facets; face shining black, lower eve-orbits silver-dusted, back of head blackish, lower posterior eye-orbits with silvery reflections and a few very short snow-white hairs Proboscis short, narrowed at base, pointed at tip, yellow, microscopically pubescent Antennæ vellow; third joint very large, round, with a rather long apical thickened bristle Thorax shining black, with microscopic grey hairs, which on the dorsum are intermixed with (or possibly wholly replaced by) yellow hairs, all microscopic. Scutellum shining black, with microscopic whitish and a few yellow hairs shining black, with inicroscopic snow-white hairs, venter similar, genitalia very minute Legs with basal half of coxe and a broad band occupying nearly all the femora, except base and tips, black or blackish brown, remainder of core and femora vellowish; tibie and tarsi white. Wings very pale grey, highly indescent; stigma yellow; basal half of costa and 1st longitudinal vein much blacker than the remainder of the veins; halteres with the stem yellowish, the club milk-white, rather large.

Length, 2 mm.

Described from a perfect of in the Indian Museum, captured by Dr. Annandale at Kurseong, Durjeeling District, 4700 ft., 15. iv 1911, on a window.

#### Genus ACRASPIDEA, Brauer

Acraspidea, Biauer, Denks K Ak Wiss. Wien, vliv, r. 75 (1882)

GENOTYPE, Acraspulea felders, Brauer

"Body oval, with short weak legs, antennæ longer than head, filiform, pubescent, placed at middle of head in profile, 1st antennal joint longer than the short 2nd, 3rd long, narrow, with four indistinct annulations, and with a terminal, shortly plumose, long, filiform bristle, scutellum unarmed, parabolic, obliquely upturned. Abdomen 5-segmented, round; all tibiæ without spurs. Only three endings to 4th vein (1st, 2nd, and 4th); four posterior cells.

" Differs from Rosapha by the unarmed scutellum and from Tinda

by the position of the antenna " \*

Range Ceylon.

The genotype is the only known species

#### 5 Acraspidea felderi, Brauer.

Am aspidea felders, Brauer, Denks. K. Ak Wiss Wien, xhr, p 76 (1882)

"& Head black, with short black pubescence, face broad and long, shining; eyes contiguous above; ocelli on a tubercle, 1st and 2nd antennal joints yellow, base of 3rd and the flagellum brown, or entirely black, with concolorous short pubescence. Tho ax robust, inflated, dorsum roughened and punctate, a triangular spot of short pale yellow pubescence extending from the suture down to the whole breadth of the hind border. Abdomen black, broader than thorax, genitalia small but prominent, brown. Legs yellow, femora with a brown ring; metatarsi very long, middle pair very thin but shorter than the tibie. Wings clear, costa brownish, submarginal cell distinctly smoke-grey nearly up to the clear wing-tip, so that the marginal cell forms a white spot on the costa between the darker parts; anal cell broad, closed at some distance from the border, veins brown; halteres pale yellow.

" Length, 5-6 mm.

"Rambodde, Ceylon (Nietner)."

## · Genus WALLACEA, Dal.

Wallacea, Doleschall, Nat. Tijd. Ned. Ind. (4) xvii, p 82 (1858),
de Meijere, Tijd. v. Ent 1, p. 234 (1907).
Gabaza, Walker, Proc. Linn. Soc. Lond. 11i, p. 80 (1859).

GENOTYPE, Wallacea argentea, Dol., by original designation.

Head about semicircular, as broad as thorax; eyes bare, in o contiguous for some distance; from broad in 2, sides parallel

\* A translation of Brauer's description

Antenue placed just above middle of head, first two joints short, normal, 3rd elongate, twice as long as first two together, 5-annulated, with a style as long as the 3rd joint itself. Proboscis and palpi small. Thorac subquadrate, very arched, slightly inflated on each side behind the very distinct suture, scutellium large, thick, bluntly pointed at tip and projected somewhat upwards, with two hardly distinct short blunt spines. Abdomen rounded, thick, as long as but distinctly broader than the thorax. Legs short, simple, slender. Wings normal; discal cell very large.

Range India and Ceylon

The genotype is the only known species.

#### 6 Wallacea argentea, Dol (Pl. I, fig. 3.)

Wallacea argentea, Doleschall, Nat Tild Ned Ind. xvii, p. 82 (1858), Brunetti, Rec. Ind Mus., p. 101 (1907).
Gabaza argentea, Walker, Proc. Linn. Soc. iii, p. 80 (1859)
Pachygaster angrofemorata, Brunetti, Rec. Ind. Mus. vii, p. 499 (1912).

d ♀. Head with the eyes in d practically contiguous for about one-third of the distance from vertex to antennæ, leaving a slightly elongate vertical shining black triangle and a much smaller frontal tuangle which is shimmering white, as are the sides of the face; rest of face and lower part of head black; probosers dark brownish yellow, antennæ orange or vellowish; 3rd joint rather broader in Q than o, with six annulations, the two basal ones the broadest, style whitish, 2-segmented, 1st very minute, tip of 2nd curved. In Q, from shining black, sparse short whitish hairs on upper part; two small round white hair-spots contiguous to eyes just above level of antenna, margins of face with a thin line of snowwhite hairs Thorax shining black, in & with broad band of golden yellow, almost tomentose pubescence on hinder half of dorsum, generally but not always reaching side-margins and always extending as far as the scutellim, which is wholly black; the whole dorsum similarly covered in 2, as is the scutellium also, sides with very sparse inconspicuous pale pubescence Abdomen moderately shining black, with very short whitish pulpescence, which is sparser in the 2; venter shining black, bare Legs yellow; femora black, tips narrowly yellowish; tibiæ a little brownish about the middle; extreme tips of tarsi brownish; temora with soft hairs, tibio and tarsi minutely pubescent Wings clear; stigma, anterior veins, and halteres yellowish.

Length, about 3 mm

Described from a long series in the Pusa and Indian Museum collections Pusa, 22. v. 1908, in bark of Erythrissa sp., 17 xii. 1914, under bark of Frons lavica, 15. ii. 1916, on rotten papaya stem; Katihar, 12. x. 1907, Bombay, vii—ix. 1912; Calcutta, 8. i. 1906, 22. i. 1908, 14. iii. 1907, 6. ii. 1908; Pollibetta, Coorg, 15-26. v. 1914, 24. x. 1915, 16. xi. 1915 (Fletcher).

#### Genus ACANTHINA, Wred.

Acanthua, Wiedemann, Auss. Zweifl ii, p 50 (1830) [preocc. Fisch. (1806)]

Aranthinia, Macquart, Hist. Nat Dipt. 1 p 240 (1834) [lapsus]
Artemita, Walker, List Dipt. Brit. Mus. v, Supp. 1, p. 61 (1854).
Acanthinomyra, Hunter, Tr. Am. Ent. Soc. Phil. xxvii, p. 129 (1901).
Cibotogaster, Enderlein, Zool. Anz. xliii, p. 305 (1914).

GENOTYPE, Clitellaria elongata, Wied., by Brauer's designation (1882).

Head more than semicircular, as broad as anterior part of thorax, eyes harry, contiguous or subcontiguous for a short distance in \$\mathcal{\sigma}\$, facets of uniform size in both sexes, from in \$\mathcal{\sigma}\$ in the narrow, sides nearly parallel, postocular orbit in \$\mathcal{\sigma}\$ broad. Antennæ placed low down on head at tip of frontal prominence, barely above level of lower part of eyes, 1st and 2nd joints short, 3id elongate, cylindrical, with short apical style. Proboscis and palpi small. Thorax moderately arched, much broader behind, anterior corners rounded, scutellium broad, nearly semicicular, 4-spined. Abdomen rounded, thick, much broader than thorax, genitalia small. Legs slender, simple, moderately long. Wings with normal venation.

Range. Orient, Mexico, Central and South America.

As the name Acanthina is preoccupied in Mollusca, Artemia, Walk., should be used, but I decline to accept changes in well-known names of such long standing. Cobotogaster, Ender., erected on slight differences in the last antennal joint, and the shape of the thorax and abdomen, does not appear generically distinct.

The two Indian species are easily known by their size, azurea being 8 to 9 mm. long and argentilurta only 3 mm.

### 7. Acanthina azurea, Gerst.

Acanthina azurea, Gerstaecker, Linn. Entoni 11, p. 335 (1867); Brunetti, Rec Ind Mus 1, p. 100 (1908)

Acanthina auricollis, Bigot, Brunetti, Rec Ind. Mus 1, p 100 (1907)

(nom nud.), Brunetti, op cit vii, p. 449 (1912), 3 Q. Cilotogaster azurca, Enderlein, Zool Anz. xlin, p. 305, fig. 11 (antenna, 3) (1914).

? Chtellar a olesa, Walker, Proc. Linn. Soc. Lond. v, p. 232 (1861); Osten-Sacken, Ann. Mus. Gen. xvi, p. 411 (1880), xviii, p. 17 (1882).

3 Q. Head with eyes in 3 with dense yellow pubescence above and brown pubescence in front, nowhere actually touching but extremely near each other for a considerable distance, and separating upwards very gradually, leaving a very narrow elongate greyish triangle below the large black occillar triangle which fills the space from eye to eye; above this the rather large vertical space is orange-brown with a few black bristles; frontal triangle smooth, shining, bare, orange; proboscis, palpi, and labella all bright orange-brown; antennæ with first two joints orange, 3rd

blackish, microscopically pubescent, sometimes orange at extreme hase with four distinct annulations and a short two-jointed style, occiput considerably concave, dark, with a little grey pubescence In 2 from a width of head, barely broader at vertex and lower end, frontal triangle large, very prominent, shining, bare, bright orange-brown, as is also the very broad posterior border to the eyes; a small brown spot on from just above the suddenly widened frontal triangle. Thorax dark shining blue, punctate. with microscopic black bristles; in o a single median stripe of vellow pubescence, not reaching anterior collar but leaving a shining black spot bare of pubescence, the stripe extending hindwards to middle of dorsum, in 2 two very narrow longitudinal median stripes, rather approximating to one another, formed of minute whitish pubescence, continued beyond suture a little, where they diverge and broaden, reaching posterior corners of dorsum; a moderately broad transverse stripe of similar pubescence along suture, narrowest in middle, a patch of short golden yellow pubescence on each shoulder and along anterior margin; pleure as dorsum, similarly punctate and with a little grey or whitish pubescence. which is silvery while and thickest above front coxe, on mesopleura just below wing, and on lower part of sternopleura. Scutellum concolorous, similarly punctate, and with greyish pubescence, spines brownish, rather short. Abdomen dark shining blue, punctate as thorax, a little grey pubescence about front corners and sides and denser and longer about centre of hinder part of 4th segment and also about base and centre of 5th, genitalia small, brown, two short telescopic cylindrical joints in d, two short filaments in 2, venter deep blue, punctate, with a little greyish pubescence Legs femora black, with a slight blue or violet tinge and a little whitish-grey hair below; knees narrowly dark brown, tibic black or dark brown, tips very narrowly a little paler, tarsi blackish brown, middle pair distinctly paler Wings dark brown, stigma and veins darker, costal cell, discal cell mainly or wholly, base of 4th posterior cell (sometimes base of 3rd or even 2nd also), anal and axillary cells (sometimes hinder part of 2nd basal cell also), clear or nearly so, halteres brownish vellow. Length, S}-9 mm.

Described from six of and one Q in perfect condition from Tura, Garo Hills, Assam, 1500 ft., vii. 1917, and above Tura, 3500 ft., vii. 1917 (Kemp), a of from Sadiya, Assam, a Q from Karkur Ghat, Nilgiri Hills, 1500 ft., v. 1911 (H. L. Andrewes); and a second of from Kohima, Assam, all in the Indian Museum; and a specimen from Coorg, S. India (T. B. Fletcher)

This species was given in my first paper on STRATIOMYIDA as "auricollis, Bigot," which afterwards proved to be merely a MS. name.

The gold pubescence on the front of the thorax and that forming an approximate cross on the thorax in the Q rubs off very easily.

## 8. Acanthina argentilirta, Biun (Pl. I. fig. 4)

- Acanthina argentea, Brunetti, Rec Ind Mus 1, p 132 (1907).
  einended in Corngendum slip of same date to argentilirta
  (argentea preocc Ost -Sack, 1886)
- Head with eyes extending whole height of head, shortly but not thickly pubescent, subcontiguous at nearest point of approach, as the frons at this point is receding, but attains the surface of the eyes towards the vertex, which is considerably raised, occupied by the ocelli, facets rather large, of uniform size, from both above and below nearest approach of eyes, shining white, occiput, underside of head, and inner orbit of eyes below antennæ white. Antenne with first two joints black, 3rd reddish brown with blackish marks, style thick. Proboscis short, yellowish, with a Thorax with dorsum, sides, and scutellum black, few harrs uniformly covered with short silvery-grey pubescence, scutellum with four rather large whitish spines Abdomen black, with short silvery-grey pubescence, venter black, with short giev hairs Legs yellowish white; femora black, extreme base and tips pale. tibiæ with a broad black band, leaving only the basal fourth and the tip pale Wings quite colourless, veins distinct, pale, no stigina apparent; squamæ very small, brownish white, halteres brownish yellow, clubs white.

Length, 3 mm

Described from a perfect 3 in the Indian Museum, from Calcutta, 22 v. 1907, Rangoon, 18-30 ix 1914 (Fletcher).

### Genus CRASPEDOMETOPON, Kert.

Craspedometopon, Kertész, Ann Mus Mung vii, p 373 (1909) Genotype, Craspedometopon frontale, Kert

Head homispherical, eyes bare, configuous in 3 for a considerable distance; upper facets larger than lower, no distinct dividingline, in Q, from to of head, sides parallel, bare, shining, a narrow ridge on each side close to eye-margin, continued at vertex around upper corners of eyes and gradually disappearing, continued downwards to some little distance above base of antennæ, meeting a similar transverse ridge, a median ridge in centre of frons, dying away at upper and lower extremities, and an oblong depression with pointed lower end just above antenna, face retreating; mouth-opening large, occiput slightly concave, shortly pubescent. Proboscis with large labella; palpi 2-jointed, a little shorter than labella, 1st joint rod-shaped, 2nd long elliptical. Antennæ placed on lower part of head, smaller in & than 2: 1st joint cup-shaped, contracted beyond base; 2nd cup-shaped; 3rd subconical, with seven distinct annulations and a very long terminal pubescent arista. Thorax robust, narrower in front than head, broader than head behind, finely punctate, dorsum arched, suture distinct, broadly interrupted in iniddle; soutellum flush with dorsum, large, arched, hind border truncate, with four strong equidistant spines; sometimes an extra pair, or occasionally five spines asymmetrically placed. Abdomen 5-segmented, robust,

broader than long, finely punctate, 1st segment very short, 2nd three times as long as 1st, 3rd rather longer than 2nd, 4th and 5th subequal to 3rd, genitalia small, concealed. Legs moderately strong, simple, pubescent. Wings normal, costa ending at tip of 3rd vein, axillary vein present.

Range India, bormosa

C frontale is the only known species.

### 9 Craspedometopon frontale, Kert (Pl. I, figs. 5, 6)

Craspedometopon frontale, Kertész, Ann Mus Hung vn. p 375, pl vn., figs. 3, 4, 10 (1909)

Head black, vertex and ocellar bump with yellow hair, which is shorter in 2, trous in 3 dull black, with a yellowishwhite hair-spot on each side above antenna contiguous to eyemargin, in Q grey, with a median shining black oval depression with its lower end pointed; white hair-spots as in o, epistoma with yellowish pubescence, occiput with yellowish tomentum. Antennæ with 1st and 2nd joints chestnut-brown, moderately shining, 3rd darker, with yellow tomentum Proboscis brownish yellow; 1st joint of palpi yellow, 2nd black. Thorax black above. slightly shining, in & the greater part with very short whitish pubescence, anterior margin and sides with short black hair, in Q pubescence brassy yellow, thicker; in certain lights can be seen three longitudinal stripes, connected in front, of which the median one reaches the scutellum, outer ones diverging towards side-margins; pleure black, more shining, but less punctate and pubescent than dorsum, humeri reddish brown at tips. Scutellum concolorous with thorax, equally pubescent, spines yellowish Abdomen black, slightly shining, closely punctate. with similar, but shorter, yellowish-white pubescence. Legs brown, pubescence yellow, iemora (except tips), upper side of front tibie, the middle and hind tibie (except bases and tips) almost black, front tarsi with black pubescence on upper side. Wings and verus basally, up to middle of discal cell, blackish, remainder yellowish, halteres brownish vellow.

Length, 41-8 mm; wings, 41-82 mm.

The above is a free translation of Kertész's description from a large number of specimens from Formosa, 111-x. 1908 (Sauter) A & and & named by him are in the Indian Museum, also two & from Tenasserim (Doherty) and a & from the Daryling District, 1000-3000 it., v 1912 (Lord Carmichael).

#### Genus TINDA, Walk

Tinda, Walker, Proc. Lmn Soc. Lond iv, p. 101 (1860)
Reastes, Walker, Ins. Saund Dipt 1, p. 80 (1851) [neo Panz , 1806]
Phyllophura, Macquart, Mém Soc. Sci. Lille, 1834, p. 507 (1835)
Eusma, Jaennicke, Abh. Senck. Nat. Ges. vi, p. 322 (1867).

GENOTYPE, Brastes indica, Walk. (as Tinda modifera); by original designation

Head more than semicircular, as wide as thorax; eyes bare,

contiguous in  $\delta$  for a long distance, from moderately broad in  $\mathfrak Q$ , wider at vertex, proboscis and palpi very short. Antenuæ elongate, cylindrical, longer than head (in type-species), 1st joint twice as long as 2nd, 3rd three times length of first two together (in indica), indistinctly annulated. Thorax elliptical, wider behind, rather flattened, scutellium nearly semicircular, with four spines Abdomen elliptical, slightly broader but baiely longer than thorax, genitalia inconspicuous. Legs short, slender. Wings rather narrow, a little longer than abdomen, venation normal

Range The Orient and West Africa

### 10. Tinda javana, Macq (Pl. I, figs 7, 8)

Bens javana, Macquart, Dipt Exot 1, 2, p 188 (1838)
Tinda javana, de Meij Tijd v Ent 1, p 232, liv, p 273
Busses indicus, Walker, Ins Saund Dipt. 1, p 81, pl 11, fig 3 (1851).
Tinda modifera, Walker, Proc Linn Soc Lond iv, p 101 (1860).
Phyllophora bispinosa, Thomson, Eug Resa, Dipt p. 454 (1869)
Tinda indicu, Brunetti, Rec Ind Mus 1, p. 92 (1907).

♂♀ Head with eyes contiguous in ♂ for greater part of distance from vertex to antennæ, leaving a very small vertical triangle wholly occupied by the black ocellar triangle and a lew short brown hairs; upper facets much larger than lower ones, frons shining black, nearly wholly occupied by two spots composed of short snow-white pubescence; face whitish grey, the colour spreading more or less along inner lower orbits of eyes, rest of lower part of head black, vertex black, no postocular margin whatever, proboses yellowish, palpi yellowish, with large spatulate tips. Antennal 1st and 2nd joints yellowish, 1st twice as long as 2nd, cylindrical, 2nd cup-shaped, both with spaise short stiff black hairs; 3rd tully two and a half times as long as 1st and 2nd together, bare, yellowish at base; remainder blackish; only a few basal annulations well defined. In 2, from at vertex \$\frac{1}{4}\$ to \$\frac{1}{4}\$ width of head, narrowing rapidly to a little above antenna. where it is less than half as wide, black and slightly shining, postocular margin very broad, bare, slightly shining. Thorax black, rather closely punctate, hardly shining, with tomentose yellowish pubescence on dorsum; sides more or less similarly clothed; humers tapped with brownish orange; a very narrow concolorous ridge thence to wing-base. Scutellum similar to thoracic dorsum; hind margin yellowish, with four rather short yellowish spines. Abdomen black, barely shining, closely punctate; venter similar; genitalia small, yellowish, ending in a small cylindrical tube in & and two finger-like lamelle in Q. Legs all yellow; last tarsal joint brownish. Wings grey, anterior margua rather darker, stigma distinct, pale brown; halteres brownish yellow.

Length,  $5\frac{1}{2}$ -6 mm.

Described from a long series in the Indian Museum and the Pasa Collections: Chapra, Bengal, often in rotting plantain stems, 16. iii. 1917, 29. iii. 1908, 27. iv. 1913 (Howlett), 28. v. 1913, 11. v 1908, v. 1907; Kathar, 8-9. iii. 1909 (Pawa), Calcutta, 2. iii. 1907,

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12. vi. 1907, 5. vii. 1907, 9 viii. 1907, 26 ix 1907; Dibrugath, N.E. Assam, 17-19. xi 1911 (Kemp), Tura, 1200-1500 ft, Assam, vi 1917 (Kemp), Batava, Java, viii. & x 1907 (Jacobson), Semarang, Java, i 1906 (Jacobson); Andaman Is, 27 iii. 1911 (Pavu)

The pupa-case is about 8 min long, pale pinkish brown, covered with whitish granulated dust, and 13-segmented; head end very pointed, from 4th segment onward, sides nearly parallel, flattened, last segment the longest, with rounded tip; on upper and lower sides a row of yellow bristles across middle of each segment.

For many years this species has been known as Tinda indica, Walk., but de Meijere supports its identity with the Beris javana of Macquart described from Java B javana, Wulp, from Sumatra,

is a different species and a true Beris\*

# Genus EVAZA, Walk.

Evaza, Walker, Proc Linn. Soc. Lond 1, p. 109 (1857); Kertész, Ann Mus Hung 1v, p. 276, Brunetti, Rec Ind Mus 1, p 97 (1907) Evasa. Auctores.

Nevua, Walker, op cit 111, p. 81 (1859) Nevna, Walker, op cit, 1v, p. 97 (1860)

GENOTYPE, Evaza bipars, Walk; by original designation.

Range. Only known from the East.

From Kertész's description there are not enough data to include E indica satisfactorily in a table of species. The frons at its narrowest part in the Q is one-thirteenth the width of the head. In E, bipars it is one-tenth or thereabouts at that part, being about  $2\frac{1}{2}$  times wider at vertex. In E flavipes the frons of the Q is four times as wide at vertex as at its narrowest part

# Table of Species

Legs all yellow, at most tips of tarsi brownish.

Scutellum with only spines yellow . . . . . . . . flavipes, Big Scutellum with hind margin yellow as well as spines bipars, Walk. Legs yellow, but with femora and tibite darker in part . indica, Kert.

<sup>\*</sup> See Brunetti, Rec Ind. Mus i, p 89 (1907), and de Meijere, Tild v Ent. l, p 232 (1907).
† The lower one being the upper branch of the 5th vein.

### 11. Evaza flavipes, Big.

Evaza flaripes, Bigot, Ann Soc Ent France, (5) ix, p 219 (1879), Brunetti, Rec. Ind Mus i, p 98 (1907), vii, p 451 (1912).

Q. Head with eyes only approximate at nearest approach; from widening to four times as wide at vertex, shining black, bare; occili brownish yellow, rather close together on slightly elevated black occilar triangle, frontal triangle with yellowish-grev pubescence; underside of head and proboscis yellow, with a little yellow pubescence, postocular orbits moderately wide, black, with traces of microscopic golden-yellow pubescence. Thosas moderately shining black, with rather dense, very short, yellowish pubescence; sides of thorax and the scutellum similar, latter with four yellowish-blown, rather long spines, which bear a few long yellow hairs. Abdomen moderately shining black, nucroscopically pubescent, genitalia small, telescopic, brownish orange, ending in two cylindrical lamelle bearing a few pale hairs. Legs all orange, microscopically pubescent; tips of tarsi brownish. Wings grey, brownish on anterior part, veins dark brown, halteres yellowish.

Length, 7 mm

Described from a single Q in the Pusa collection from Darjiling, viii. 1908 (Middleton)

## 12. Evaza bipars, Walk. (Pl. I, fig 9)

Evaza bipais, Walkei, Proc Linn Soc Lond 1, p. 110, pl. vi, fig. 2 (1857), Brunetti, Rec Ind Mus 1 p. 98 (1907)

Evaza flavipes, Wulp (nec Bigot, 1879), Term Fuzet. xxi, p. 416 (1898).

3 ♀ Head with eyes configuous in 3 for greater part of their length, leaving a very nairow and elongate vertical triangle, shining black, upper and iront facets much larger than others, ocellar tubercle very elevated, black; ocella very distinct, large, reddish, the small from and lower part of head ash-grey, with a little whitish pubescence, occiput black Antennæ placed much below middle of head in profile, orange-yellow, arista black; proboscis and the large labella and the palpi orange-yellow. In ?, trons double as wide (or rather more) at vertex as at point of nearest approach of eyes, at which latter point it is I width of Thorax shining black, suture very distinct; dorsum with very short yellow pubescence, which extends to the scutellum, humeri orange-brown, a yellowish ridge from humeri to wing-base; posterior corners of dorsum rather sharply cut away, orangebrown; pleuræ shining black, sternopleuræ with yellow pubes-Scutellum black, spines brownish yellow; metanotum shining black Abdomen dull shining black, with short black pubescence; a little yellowish pubescence at sides; genitalia very small, mainly concealed, venter black, shortly pubescent pale yellow, with soft short concolorous pubescence. Il'inga pule vellowish grey, stigma large, yellow, veins yellowish brown; halteres yellow.

Length, 5-6 mm.

Described from three or four of each sex in the Indian Museum and my own collection, Darjiling, 7000 ft, 12. vi. 1914 (Gravely), Lebong, Darpling District, 13 vi. 1914 (Gravely) — It occurs also in Papua, Borneo, and Sumatra

#### 13. Evaza indica, Kert.

Evaza indica, Kertész, Ann. Mus. Hung. iv, p. 289 (1906).

3 ♀. Head with frontal triangle shining black, except upper part, which is silvery-white tomentose, from in Q shining black, broad above, much narrower below, only one-thirteenth of breadth of head at narrowest part, from on lower half somewhat impressed at the termination of the fine ridge that starts from the ocellar tubercle, occipital ridge strongly produced; epistome black, with silvery-white tomentum, proboscis and palpi brownish yellow, with concolorous bair; occiput black, with grey hair on lower part. Antennæ brownish yellow, arista black, appearing thick on account of the dense short pubescence-moreover, it is shorter than in any other species, being only a little longer than the antennæ. Thorar with nearly parallel sides, dorsum flat, black, finely punctate, with sparse yellowish tomentum-like pubescence, which is a little thicker on posterior half, humeri as well as the narrow ridge up to wing-base brown, pleura shining black, pubescence short, rather thick, greyish white Scutellum black, on a level with thorax, punctate and pubescent like dorsum of thorax, only extreme margin and spines brownish yellow. Abdomen only a little longer and broader than thorax, black, finely but closely punctate, dorsum with yellowish brown, depressed, short pubescence; venter with sparser greyish pubescence. Legs pale yellow, femora darker towards tips; fore tarsi and last two joints of middle and hind legs blackish brown; pubescence on legs very short, yellowish white. Wings slightly brownish; anterior margin of subcostal cell brown up to the wing-tip, but greater part of marginal cell clear.

Longth, 6-61 mm.; wings, 4 mm.

Described from two of of and a Q from Bombay, 3. vin. 1902 (Biró).

Types in the Budapest Museum.

The foregoing is a translation of Kertész's description.

#### Genus PTILOCERA, Wied.

Ptilocera, Wiedemann, Nova Dipt. Gen. p. 7 (1820); Brunetti, Rec. Ind. Mus. 1, p 90 (1907)

GENOTYPE, Strationus quadridentata, F. (Malay Archipelago); by original designation.

Head semicircular or slightly flattened in front, as broad as thorax; eyes bare, contiguous in  $\sigma$  for a considerable distance,

upper facets distinctly larger than lower ones; from in Q moderately broad; proboscis barely protruding from mouthopening; palpi small. Antennæ very characteristic, in o first two joints short, minutely bristly, 2nd rather shorter than 1st: 3rd with seven annulations, 1st and 2nd annulations short, bare. cylindrical, about the size and length of the first two antennal joints, 3rd annulation in the shape of a two-pronged fork without stem, 4th and 5th annulations similarly shaped but with stems, 6th annulation elongate, much broader at tip than base; 7th annulation somewhat like 6th but shorter and more linear; a long terminal style of about half as long as whole antenna, composed of very dense microscopic feather-like pubescence In 2, two basal joints and first two annulations of 3rd joint as in d, except that from inner or under side of tip of 2nd annulation emerges a long feather-like ray, the double row of plumes drooping downwards, 3rd annulation very short, cylindrical, much narrower than 2nd, bearing two similar rays, 4th and 5th annulations very elongate, narrow, cylindrical, each bearing two such rays, 6th and 7th very elongate, about as long as 4th and 5th, rather wider towards tips, without rays but nicroscopically pubescent; style as long as in d, but apparently of a sponge-like texture, generally white, with microscopic pubescence Thorac elliptical, broader behind, moderately aiched, scutellum nearly as long as broad, more than semicircular, with four distinct subequal spines. Abdomen of five segments, not longer than thorax, slightly broader, almost rounded, anterior corners rather angular. rather thick; of genitalia very small, barely projecting, those of the 2 apparently telescopic, cylindrical, of two pieces and with two small finger-like terminal lainelle. Legs moderately long, slender, without conspicuous pubescence. Wings of normal subfamily venation; 3rd vein forked; three discal cell veinlets equidistant, including the upper branch of the 5th vein, anal cell closed at some distance from border; wings folded over abdomen at rest. longer than abdomen.

Range. The Orient and South Africa.

Only one species is definitely known as Indian, P fustuosa, Gerst., though the Indian Museum possesses two specimens in bad condition from the Andaman Islands which Bigot named "continua, Walk.", but they cannot be this species and are probably P. quadridentata, F., a species easily recognised by the large golden-haired spots with angular inner corners on the anterior margin of the thorax.

# 14. Ptilocera fastuosa, Gerst. (Pl. I, figs. 10, 11.)

Ptilocera fastuosa, Gerstaecker, Linn. Ent. xi, p. 832 (1857)

? Ptilocera smaragdina, Snellen v. Vollenhoven, Tijd. v. Ent. i,
p. 92 (1857)

Q. Head: from one-fourth of head or a little more (nearly 3 mm), shining black, flush with eyes, very slightly sunken in

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middle; sides parallel, except for a very slight contraction about the middle; about the upper halt closely punctulate, with minute bristles; these bristles also cover the ocellar triangle, which is elevated above eye-level; ocelli reddish brown; a large dark chestnut-brown shining bare callus above antenno, not easily distinguishable from the frons, and just above it a grey tomentose spot (seen only in certain lights) on each side, contiguous to inner eye-margin, face with practically parallel sides, as wide as frons, black, with a shining bare spot just below antennæ; a little whitish pubescence, which is rather longer along lower eye-margins. Antennal first two joints shining black, first two annulations of 3rd yellowish-grey tomentose, rays dark shining blackish brown; terminal style yellowish white, sponge-like. Proboscis, palpi, and occiput black, the latter with a little greyish-white pubescence, longer on posterior orbits, especially on lower part. Thorax black, very closely punctulate, with minute black spines and with very small scales that exhibit emerald-green and mauve reflections according to the light, these scales, in addition to general distribution, form in good specimens four distinct equidistant longitudinal stupes from anterior to posterior margins, the two outer ones along side-margins of dorsum, the scales also occur below the wing-base, on the mesopleura, and on the scutellium, shoulders rounded, humer inconspicuous, steinopleura with greyish-white tomentose pubescence; scutellar spines black. Abdomen shining indigo-blue or violet, entire surface closely punctulate and covered with minute bristles like the thorax, anterior corners of 2nd segment with a little, very short, whitish pubescence, and a small whitish hair-spot towards upper outer corners of 3rd and 4th segments; 5th segment depressed longitudinally in middle, most of its middle surface with short whitish pubescence, or the hind margin only, or the pubescence in the form of two circles separated by the median depression. Genitalia small, brown, mainly con-Venter like upper side, with very minute soft whitish pubescence. Legs shining black, with microscopic grey pubescence; a little shining brown about trochanters and base of femora and, perhaps, extreme tips of femora, underside of hind tibia with golden brown pubescence. Wings blackish brown; base of 4th posterior cell, greater part of anal and axillary cells, alula, and base of wing clear; a yellow streak from costa about stigma, continued hindwards to outer side of discal cell, veins dark brown; halteres black.

Length, 9-101 mm.

Described from six Q Q in the Indian Museum: Darjiling District, 1000-3000 ft., v. 1912; Singla, Darjiling District, vi. 1913; Sukua, base of Darjiling Hills, 500 ft., 1 vii 1908; Parambikulam, Cochin State, 16-24. ix. 1914 (Gravely); Kandy, Ceylon, vii. 1910; Peradoniya, Ceylon, 20. v. 1910, Pollibetta, Coorg, 15-26, v. 1915 (Fletcher), Hopin, Upper Burma, viii. 1914 (Fletcher); above Tura, Assam, 3900 ft., vii. 1917 (Kemp).

I have not seen the male with certainty, and the following notes are from Gerstaecker's description of that sex. Very distinct from Q, much smaller. Head considerably broader than thorax, deep black, with one white hair-spot above antennæ, the latter with 2nd scapal joint and first two annulations of 3rd joint reddish yellow, rest black. Thorax with ground-colour dark blackish brown, sidemargins and two very indistinct median stripes of emerald-green scales. Scatellar spines, especially middle pair, much longer than in Q and mainly reddish yellow. Abdomen deep black, with paler sides, white spots as in Q, but posterior ones absent. Wings as in Q, pale spot on inner border absent.

A of from Coorg, S. India, in the Pusa collection, may be this species also a of from Pashok, Daijiling, 2000 ft 11 vi 1916 (L. C. Hartless), though neither of them agrees quite with

Gerstnecker's description.

### Genus STRATIOSPHECOMYIA, Brun

Stratiosphecomyra, Brunetti, Rec. Ind. Mus. 1x, p 261 (1913)

GENOTIPE, Stratiosphecomyna variegata, Brun

Head flattened, semicircular, narrower than greatest width of thorax, nearly bare, occuput not at all projecting behind eyes, ocelli on small, very distinct prominence, equidistant; eyes in & quite contiguous for a moderate distance, hinder and lower facets distinctly smaller than anterior and upper ones. Proboscis thick, apparently moderately long but mainly concealed within the mouth-opening, probably producible, palpi elongate, a little pubescent, apparently of one joint only. Antennæ elongate, nearly filiforin, two-thirds as long as head and thorax together; 1st joint about twice as long as broad, 2nd about half this length, flagellum with eight distinct annulations, subequal, except the last which is rather longer and pointed. Thorax approximately oval, widest at level of wings, only slightly arched, microscopically pubescent here and there. Scutellum of moderate size, semicircular or subtriangular, unspined. Abdomen with a little soft pubescence towards sides at base, apparently 5-segmented, the emargination between the 2nd and 3rd segments extremely indefinite, possibly these forming but a single segment, the 1st very short, transverse, 2nd as wide as 1st at base, thence suddenly narrowing at half its length to cylindrical form, the 3rd at base as wide as tip of 2nd, rapidly widening to tip; the abdomen widening to tip of 4th segment, thence rapidly narrowing, the tip rounded, the 2nd to the 5th segments subsqual in length. Genitalia exposed, fairly complex, consisting of a dorsal plate and a pair of two-jointed hairy claspers, with apparently at least one other pair of appendages. Logs quite slender, moderately long, munutely pubescent; hand legs longer and slightly stouter, hind femora barely thickened towards tips, hind metatarsi distinctly incrassated, broader and longer than the remainder of the tarsus, 4th tarsal joint of all the tarsi distinctly shorter than any others. Wings well developed, fairly broad, a little longer than abdomen, venation as in Pachygaster, halteres large.

# 15. Stratiosphecomyia variegata, Brun. (Pl I, figs. 12, 13)

Stratusphecomyra variegata, Brunetti, Rec Ind Mus 1x, p 201 pl xiv, figs 14, 17 (1913).

3 9. Head eyes in 3 contiguous for one-fourth the distance from vertex to antennæ, vertex rather depressed, with conspicuous ocellar prominence, wholly black, frontal triangle brownsh yellow, bare, shiring, flush with eyes, face lighter brownish yellow, with almost microscopic whitish pubescence and two large circular black spots below base of antennæ, the hinder part of the lower part of the head black, probosers and palpi brownish yellow, withdrawn, with a little pale pubescence, antenne cylindrical, nearly filiform, scape brownish yellow, bare, 1st joint twice as long as 2nd, flagellum black, with eight annulations, subequal, except that the last one is a little longer and pointed trons and face greenish yellow, shining, with very short soft whitish pubescence; former at level of antennæ nearly & width of head, with parallel sides, a blackish transverse streak from eye to eye a little below vertex, embracing ocellar triangle, the latter shiming black, slightly elevated, face rapidly broadening from below antennæ, a thin black ring on face around base of each antenna; a conspicuous round black spot on each side immediately below antennæ, a transverse narrow black band a little lower, from eye to eye, underside of head retreating, greenish yellow, smooth, shining, with whitish pubescence, and two longitudinal blackish-brown marks in each side of month-opening; posterior orbit of eyes distinct, but rather narrow, yellow, bare. Thorax black, microscopically pubescent, with bright lemon-yellow markings as follows .- On anterior margin of prothorax; the humeral call: a large triangular mark at each end of the transverse suture, in front of root of wing, a broad band from shoulder to wingbase; the posterior margin of dorsum of thorax broadly yellow, in the form of four contiguous triangles, the outer ones approximate to wing-bases; a large spot placed diagonally on the sternopleura; a curved one between it and the wing-base and lastly one behind the wing, almost configuous to the metanotum. Sides of thorax with extremely short and rather sparse pubescence, which is black or yellow in accordance with the colour of the surface. Abdomen with basal segment reddish brown; 2nd, except perhaps at extreme tip, black; remainder of abdomen reddish brown, with a narrow indistinct transverse blackish streak at base of 4th, and a similarly coloured subquadrate large spot on base of 5th, filling the major part of the segment. Legs with coxe black, tips sometimes a little paler; anterior legs yellowish, tibix indistinctly a little darker, fore tarsi black, except metatarsus, middle metatarsi yellowish white, rest of tarsus brownish yellow. Hind legs brownish yellow, with indistinct traces of brown here and there, base of femora narrowly pale yellow; tibiæ rather flattened at base and slightly prinched beyond the middle, with two indistinct, though fairly obvious, moderately broad, blackish rings, one just beyond base, the 2nd subapical; tarsi biownish yellow, last two or three joints black; the 4th joint in all the taisi much shorter than any of the others Wings pale grey, gradually darker on apical half, stigmatic region moderately dark brown, ill-defined; halteres large, yellow. Venation as in Pachygaster.

Length, 11-12 mm

Described from five & &, Darjiling, 1000-3000 ft, v. 1912; one 2 from above Tura, Garo Hills, Assam, 3900 ft., vn. 1917 (Kemp), a pair from Shillong, 4900 ft., 31. v. 1918 (Rao).

## Subfamily CLITELLARIINÆ.\*

Head comparatively larger than in PACHYGASTRINE: eyes often densely harry. antenne variously shaped; 3rd joint annulated, elongate (Lasiopa), conical (Olitelluria), or somewhat clubbed or oval (Oxycera, Nemotelus) Thorax stout, subquadrate or widened in the middle, occasionally with a strong spine on each side (Ephinpuum, Negritomyia), scutellum spined or not. Abdomen about as long as thorax, 5- or 6-segmented, varied in form, generally subquadrate or oblong. Legs moderately long and strong, with soft pubescence or bare. Wings with 2nd vein often apparently anastomosed with 3rd; 4th vein with three terminations; 5th vein forming hinder side of discal cell, therefore posterior cross-vem absent. In some cases the 5th vein touches the discal cell for so short a space that the connection almost appears as the posterior crossvein , † 5 posterior cells, all united on wing-margin.

This subfamily is characterised by the absence of the posterior cross-vein, therefore the discal cell apparently emits four veins. The normal absence of an antennal arista and apparent union of the 2nd vein with the 3rd are also good characters. The species are moderately or rather densely pubescent, or quite bare.

Lafe-history Larva, in addition to the eleven body-segments, with an apical tip at the posterior end, bearing a few bristles instead of a fringe of hairs. The metamorphoses of some European species of Oxycera are well known, the larvae living in mud or water; and that of Ephippium also, it being parasitic in nests of Formica fuliginosa.

<sup>\*</sup> For table of Oriental genera, vide Brunetti, Rec Ind Mus 1, p 113, for Hermetine, id l c p 120 (1907).
† According to Verrall, in such cases the species are regarded as belonging to the Olitalianne. The presence of the posterior cross-voin would place them in the Strationying, this character being the only structural dividing-line between them It would perhaps be better to unite both groups under STRATIONYIN &

The HERMETHEM have by some authors been separated from the CLITELLARIEM proper, but it seems better to retain them under one subfamily

Table of Genera.	
1. Thorax with a strong side-spine	2. 3.
2 Antennal style bare	Ернірріим, Latr, р. 45 [р 47.
cuous	NEGRITOMYIA, Big.,
Scutellum unspined  4 Antennal 3rd joint very long, filiform.	6 Ampsalis, Walk., p. 44.
Antennal 3rd joint elongate or conical,	5 [p. 49.
5 Third antennal joint with distinct style Third antennal joint with arista	CLITELLARIA, Mg., OXYORRA, Mg., p 53
6 Abdomen globose, much broader than thorax	Ruba, Walk., p. 48.
Abdomen elliptical or linear 7. Antenne not longer than head; 3rd joint	7
conical	Lasiopa, Brullé, p. 52.
very elongate or nearly filtform  8. Abdomen linear, considerably longer	8.
than thorax, antennæ cylindrical or rather flattened	Hermetia, Latr, p. 39
Abdomen elliptical, barely longer than thorax, antennæ cylindrical, subfil-	
form	EUDMETA, Wied., p. 41.

# Genus HERMETIA, Latr

Hermetiu, Latrelle, Hist. Clust Ins. xiv, p. 338 (1805), Brunetti, Rec. Ind Mus 1, p 121 (1907)

Thorasena, Macquait, Dipt Exot. i, pt 1, p. 177 (1838).

GENOTYPH, Musca illucens, L. (Tropical America); by original designation.

Head transverse, distinctly wider than thorax; eyes microscopically pubescent; from broad in both sexes. Antennæ with 1st and 2nd joints cylindrical, 2nd half as long as 1st; 3rd very elongate, cylindrical, 5-annulated, with an about equally long, densely pubescent style, shaped like an elongated club. Proboscis rather short, with large prominent labella, palpi short, cylindrical. Thorax subquadrate, moderately arched; scutellum semicreular, unspined. Abdomen linear, arched above, considerably larger than thorax, 5-segmented in 3, 6 or 7 in 2. Genitalia in 3 characteristic, attached to ventral side of 5th segment, consisting of a piece broadened at base, pointed at tip, apparently membranous, bearing on each side a two-jointed palp-like organ, also membranous; two horny oval valves, probably for enclosing the

membranous organs, and bearing a spine on the underside. In the 2 the 6th and 7th segments are narrow, telescopic and withdrawable into the 5th; genitalia consisting of a triangular bifid piece, with a small filamentous two-jointed appendage on each side. Legs moderately long, slender, simple. Wings with normal venation of subfamily.

Range. India and the East; North, South, and Central America;

Africa

# 16. Hermetia læta, Meij. (Pl I, figs 20, 21.)

Her metra leeta, de Meijere, Bijd tot Dierk. xviii, p 93, pl viii, fig 8 (1904), Brunetti, Rec. Ind. Mus. 1, p 122 (1907)

Her metra cerrordes, Brunetti, l. c

3 9 Head yellow; a blackish cross-band above middle, on each side contiguous to eyes a blackish triangular spot above level of antennæ; vertex more or less blackish, occiput black; antennal 1st and 2nd joints brownish yellow, 3rd blackish. Thoraw black, slightly shining, an indistinct whitish median line on anterior part, only reaching to suture, \* humeri, a contiguous triangular spot on each side of anterior margin, a short contiguous or subcontiguous side-stripe from humeri, reaching suture and thereat slightly upturned, posterior calli and scutellium, all bright vellow; latter sometimes narrowly black at base On sides of thorax a horizontal eval yellow spot between 1st and 2nd pairs of coxe. and a vertical oval one just in front of it, reaching wing-base. Abdomen with first three segments mainly black, remainder reddish brown, a pair of large, approximately oval, yellow spots near each other, placed longitudinally on auterior margin of 2nd segment (the spots much smaller in 2), with a small spot at each side on extremity of hind margin, 3rd and 4th segments with distinct yellow hind margin; 5th with an elongate triangular spot at tip, which in 2 is narrower and longer, nearly reaching anterior margin, sides of abdomen yellow down to about end of 31d segment. Venter with basal three segments mainly black, 2nd a little pellucid at sides and tip, remainder reddish brown, hind margins of 3rd and 4th segments narrowly yellow. Legs yellow; femora blackish brown, narrowly pale at tips, more broadly so on front pair; tips of tibie a little darker, tarsi yellowish white. In one specimen the basal half of all the femora is pale. Wings yellowish grey, veins pale brownish yellow, halteres yellowish

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Length, 8-12 mm.

Described from two & and eight & & in the Indian Museum in bad condition, probably the same set from which de Mejiere compiled the original description, as he records the species as "bred from a betel-nut palm in Backergunge, Bengal; in Indian Museum, 2 & &, 3 & & ?

<sup>\*</sup> I do not perceive this.

These insects bear no history and were named "cenoides, Walk." (I do not know by whom), and from the set I selected one as læta, Meij, and recorded it in my first paper on Stratiomyidæ, referring the remaining specimens to cerioides, Walk. A closer examination reveals them all to be læta, as they agree with the description exactly \*

Osten-Sacken notes that fresh specimens of cerioides, Walk., have green (as recorded by Walker) instead of the yellow spots in dried ones, but this change after death is frequent in this family. H cerioides, Walk, differs by the legs being (presumably) black, with lurid knees and white tarsi, by its blackish-brown wings, and the absence of the single spot on the 5th abdominal segment.

#### Genus EUDMETA. Wied

Eudmeta, Wiedemann, Auss Zweifl. 11, p. 43 (1830) Toxocora, Macquart, Dipt Evot. Supp. 1v, p. 44 (1849)

Genotype, Hermetia marginata, F, by original designation.

Head about as broad as widest part of thorax, rather more than semicircular; eyes very large, bare, contiguous in 3 for a considerable distance, upper facets larger than lower in 3, ot uniform size in 2. Antennæ inserted below middle line of head; 1st and 2nd joints subequal, normal, short, 3rd longer than head, cylindrical, of eight indistinct annulations. Proboscis short; palpi small, cylindrical. Thorax rather elongate, oval in front, broader behind, moderately arched, scutellum subtriangular, rounded at tip, unspined Abdomen elliptical, comparatively broad at base, as long as or a little longer than thorax, flattened, depressed towards tip; genitalia in 3 distinct, small. Legs moderately long, thin, simple, tarsi long Wings with normal venation, discal cell triangular.

Range The Orient

Wiedemann describes the antennæ as 5-jointed and Macquart follows suit, both illustrating these organs; but it seems only a question of the distinctness or otherwise of the annulations of the 3rd joint, which is not infrequently an individual matter, some specimens showing their clearly and others very indistinctly. The same occurs in many individuals and species in this family.

# Table of Species.

Shorter, brownish-yellow species, abdomen distinctly broader than thorax, 3rd antennal joint as long as half width of head . . .

flavida, Brun.

Elongate blackish-brown species, abdomen no broader than thorax, 3rd antennal joint nearly as long as width of head

Abdominal side-margins green (in life, yellow in dried specimens)

Abdomen without differently coloured side-margins...

marymata, F. brunnea, Meij.

<sup>\*</sup>Mr Bambrigge Fleicher bred it from larvæ found in rotting stems of a betel-nut tree at Karimganj, vir 1918.

## 17. Eudmeta marginata, F. (Pl I, fig 17.)

Mermetia mai ginata, Fabricius, Syst. Antl. p 63 (1805).

Eudmeta man ymata, Wiedemann, Auss. Zweifl. 11, p. 43, pl 1x, fig 4 (1830), Macquart, Dipt. Exot Supp. 11, p. 16, pl 1, fig 9 (1848); Brunetti, Rec Ind Mus. 1, p. 123 (1907), de Meijere, Tijd v. Ent liv, p. 262 (1911), Kertész, Ann. Mus. Hung. vii, p. 388 (1909).

Hermetia cingidaris, Guérin, Voy Coq, Zool ii, 2, p 290 (1880). Hermetia singularis, Guérin, Icon. Règn An vii, p. 543, pl. 98,

fig 1 (1835)

Toxocera limbiventies, Macquart, Dipt. Exot. Supp 1v, p. 45, pl. v, fig. 3 (1849).

of ♀. Head eyes in of contiguous for a considerable distance, leaving a moderate-sized vertical triangle and small frontal triangle, upper facets very much larger than lower, vertical triangle wholly occupied by ocellar tubercle and brownish ocelli; a tew brownish or greyish hairs; frontal triangle very small, shining dark brown; tace dull brownish grey, with white pubescence, two small contiguous pale spots with a small orange longitudinal streak below them, immediately below base of antenne, the latter orangebrown, 3rd joint with eight annulations, darker towards tips; underside of head blackish, with white pubescence, probosus dark, with very large, brownish orange labella, occiput black, with whitish microscopic pubescence on upper part, a little longer on lower part. In 2, from moderately narrow,  $\frac{1}{2}$  or  $\frac{1}{8}$  of head, sides nearly parallel, brownish orange, nearly bare. Thorax rather dull black, with short brownish pubescence on dorsum, more whitish and sparser at sides; a small callus on shoulder, joined to an elongate stripe on lower margin of dorsum ending at suture; hind corners of dorsum with a similar callus, contiguous to an elongate one immediately below, placed vertically, a moderatesized oval spot on sternopleura and a subtriangular one just in front of wing-base; all these spots orange or yellowish (possibly apple-green in life), and slightly variable in shape and extent: scutellum black, with a moderate-sized rounded pale yellow spot at tip. Abdomen dark bluish black, microscopically pubescent, slightly shining, extreme side-margins orange-vellow (green in life), vertex blackish. Legs all dark brown or blackish; a little soft pubescence behind, at least, front femora. Wings grey; a rather brown streak across the middle from the small brown stigma to anal cell; a large apical brown suffusion beginning distinctly beyond discal cell; halteres brownish yellow.

Length, 11-13 mm

Described from five & & and one Q in the Indian Museum from Darpling, 1000-3000 ft., vi. 1912; Pyinmana, Burma, vi. 1910 (H. L Andrewes). The Q bears no locality. The specimens appear to have been in spirit and are consequently unreliable for descriptive purposes, especially in the mutter of pubescence; but they are undeniably E marginata The species occurs in Singapore, Java, Borneo, Amboina, and North-east Sumatra.

EUDMETA. 43

### 18. Eudmeta brunnea, Mey.

Endmeta brunnea, de Meijore, Bijd tot Dreik. xviii, p. 94, pl viii, fig 10 (1904)

d ♀ Head with from at level of antennæ, one-fourth of head, a little parrower at vertex and a little wider at lowest part of face; yellowish brown; antennæ blackish brown. Thorax yellowish brown, sides a little darker Abdomen yellowish brown, 2nd segment in middle with two blackish-brown longitudinal stripes near side-margins; 4th and 5th segments with hind borders blended together so that the whole surface is blackish brown, except that in the 4th is a triangular middle spot of the groundcolour, anterior border of this segment narrowly yellow, venter yellowish brown, tip darker. Abdoinen in Q lighter in middle. Legs anterior tarsi darker at tip; hind tibie and tarsi black; rest of legs yellowish brown, hind metatarsi in ♀ as long as tibie, whereas they are shorter in the d. Wings rather dark, more yellowish on anterior border, tip and a band across the middle blackish brown, more or less connected with a dark patch in anal cell; halteres brown.

Length, 14 mm.

Described mainly from a specimen in the Indian Museum from Kohima, Assam, augmented by de Meijere's description of a d

and 2 ♀♀ from Darjiling

The only discrepancy is the fact that the thoracic dorsum is darker than the sides instead of vice versa, also the dorsum of the abdomen is mainly blackish brown, except towards sides on anterior half, where it is lighter brown.

## 19 Eudmeta flavida, Brun

Eudmeta flavida, Brunetti, Rec. Ind Mus vn, p 454 (1912)

d Head with eyes contiguous for two-thirds the distance from the very small vertex to the frons, upper facets rich red-brown, much larger than the lower ones, which are nearly black; ocellar triangle small, black, slightly elevated, with a few hairs, lower margin of eyes white; from and face smooth, bare, hvid yellow. Mouth and proboses brown; palpi small, black, oval at tip. Antenno yellow, almost bare, except a few hairs at tips of the first two joints, which are very short; 3rd joint elongate, with a little greyish shimmer towards the rather narrowed tip, ending in a distinct, moderately long, black, cylindrical style, which is 3-jointed and very closely black pubescent, the first two joints very short. Occiput not projecting beyond hinder margin of eyes, much invaginated in the middle; yellowish, with very short hairs. Thorax rather dull brownish yellow; sides, scutellum, and metanotum concolorous, except that the scutellum is rather reddish. Whole dorsum, sides, and soutellum covered with soft, dense, pale vellow hair. Abdomen rather shorter and more globose than E. brunnea, Meij.; ferruginous brown, blackish on the edges and towards tip; whole surface with close, short, yellow pubescence. Venter similar, pubescence very short. Legs brownish yellow, a dark brown ring on apical half of hind tibite, tarsi tips black. The legs are minutely yellow pubescent, the colour brightest on the tarsi. Wings pale yellow, veins brownish, a stigma-like oval black spot towards tip of upper basal cell, the end of the wing mainly occupied by a brown suffusion which dies away towards posterior margin, halteres yellow.

Length, 8 mm

Described from a single of in good condition in the Indian

Museum collection from Margherita, Assam

The abdomen is much shorter and more rounded than in *E marginata*, which makes me doubtful whether it is well placed in *Endmeta* 

#### Genus AMPSALIS, Walk

Ampsalis, Walker, Proc. Linn Soc Lond. iv, p 98 (1860)

GENOTYPE, Ampsalis geniata, Walk. (Celebes), by original designation

"Body elongate, nearly linear Head a little broader than the thorax, eyes prominent, palpi very short. Antenna filiform, much longer than the breadth of the head; flagellium linear, about twice the length of the scape; joints indistinct. Thorax elongate elliptical; scutellium armed with two obliquely ascending spines. Abdomen elliptical, a little broader but not longer than the thorax. Legs rather long. Wings narrow, 1st cubital vein about one-tourth the length of the 2nd,\* four externo-medial veins complete,† subanal vein curved, joining the anal vein at some distance from the border; discal areolet elongated and attenuated exteriorly, exterior side very short."

Range. The only other species than A longispinus comes from Celebes.

# 20. Ampsalis longispinus, Brun. (Pl I, figs. 18, 19.)

Ampsalis longispinus, Brunetti, Rec. Ind. Mus. 18, p. 261, pl. 219, figs 2, 4, 16 (1913)

3 Q. Head twice as broad as long, eyes in 3 contiguous for greater part of distance from vertex to antennæ; from shining black in 3, one-fourth to one-fifth width of head in Q, less shining, bare, ocelli on distinct prominence, yellowish; occiput black, minutely pubescent. Antennæ black, 1st and 2nd joints subequal, cylindrical, barely broader at the narrowly brown tips, minutely spinose; 3rd joint cylindrical, almost filiform, pointed, with eight annulations. Thorax dull black, with microscopic pubescence, which in perfect examples is probably blackish or dark

<sup>\* 2</sup>nd and 3rd longitudinal veins respectively † 4th longitudinal vein-endings

grey; traces of a little brownish colour behind the wings; hind corners of dorsum distinctly so coloured Scutellium of normal size, shining ameous or blue-black, with soft (? pale) hairs and two very long, powerful, conspicuous, reddish-brown apical spines half as long as the abdomen, diverging and directed slightly upwards. Abdomen brownish yellow; 1st and 2nd segments mainly black, hind border of latter brownish yellow, 3rd and 4th each with a rounded or subquadrate blackish spot of considerable size towards each side but clear of the margins, these four spots in the 2 nearly filling the surface of these segments. 5th and 6th segments in both sexes mainly black, but sides and hind margins brownish yellow. Venter with 1st, 2nd, 4th, and 5th segments mainly black, remainder brownish yellow, the black colour a little more extended in o, whole surface of venter in both sexes with very short yellowish pubescence Genitalia in & concealed; in P a narrow cylindrical tube, with a pair of rather long brownishyellow harry filamentous appendages. Legs yellow, hand tibue merassated on apical two-thirds, black, hind taisi longer than tibie, the hind metatarsus black for two-thirds of its length and as long as the remaining joints taken together. Wings distinctly vellowish, very shining, apical third and hind margin grey; stigma black or blackish brown, veins blackish, halteres yellow.

Length, 10-13 mm

Described from three of and four QQ from Darphing, 1000-3000 ft, v-v1 1912, and Singla, iv 1913, in fair condition; Shillong, 4900 ft., 31 v.1918 (Rao), 5000 ft, vi-vii 1918 (Fletcher).

There is nothing material to prevent this species from coming in *Ampsalis*. The head is barely as wide as the thorax at its widest part, and Walker says the scutellum is armed with two oblique ascending spines, but does not mention their great length. The only apparent discrepancy is that he says the flagellum is about twice the length of the scape, whereas in the present species it is fully three times as long, but this difference would not be generic.

### Genus EPHIPPIUM, Lutr

Ephappaum, Latrelle, Gen Orust. Ins. iii, p. 448 (1802-3), and xiv, p. 341 (1804).

Ephappampa, Bezzi, Zeits Hym. Dipt. ii, p. 191 (1902); Brunetti, Rec. Ind. Mus. i, p. 115 (1907)

Genotife, Strationys ephippium, L. (Europe), by original designation.\*

Head comparatively small, as wide as front part of thorax; face arched, not projecting in profile, densely pubescent; palpi long and thickly pubescent; eyes densely harry in both sexes, in d

\* [Latreille did not actually designate a genotype; in vol. iii he mentions two species as belonging to his genus, viz., imeroleon, L., and ephippeum, L., in vol. xiv he gives the same two species in reverse order.—Ed.]

contiguous for a considerable distance, facets of equal size; in 2, from broad. Antennæ as long as broad, 1st and 2nd joints subequal, 3rd elongate, indistinctly annulated, with long pointed bare apical style. Thorax a little longer than broad, narrower in front, with a conspicuous spine on each side, just before the base; humen elevated, scutellum higher at base than hind part of thorax, with two long thick hairy spines. Abdomen ovate, flattened, a little longer and broader than thorax and scutellum Legs strong, moderately long, front coxe large. Wings strongly rippled, but not ribbed, traces of posterior crossvein, as upper branch of 5th vein is in almost punctiform contact with discal cell, discal cell-veinlets distinct, alula unusually large; alar squame absent, thoracic pair small

Range Europe, Japan, South Asia.

Life-history That of the European E thoracicum, Panz, 18 known, a conspicuous but hardly a common species The larve are parasitic in nests of the ant, Formica fulliginosa records finding one in a rotten nut-tree, and thinks they must take about four years to reach maturity.

The alleged preoccupation of Ephippium by Bolten in Mollusca, on which Bezzi suggested Ephippiomyia, is very doubtful, according to Verrall, and the original name is of too old standing to be

altered.

# 21 Ephippium bilineatum, F. (Pl. I, figs. 15, 16)

Stratiomys bilineata, Fabricius, Syst Antl p 79 (1805) Clitellaria birittata, Wiedemann, Zool Mag. 1, p 3 (1814), Auss.

Zweifl. 11, p 46 (1830)

Ephippium angustum, Macquart, Hist. Nat Dipt. 1, p 252 (1834). Rhaphiocera spinithorax, Macquart, Dipt Exot. Supp. in, p. 17. pl. 1, fig. 7 (1848).

Chtellaria tenebrica, Walker, List Dipt Brit. Mus 111, p 522

Ephippium spinigerum, Doleschall, Nat Tijd Ned. Ind. x, p. 407. pl. ix, fig. 2 (1856)

Negritomyia hlineata, Wulp, Notes Leyd. Mus vii, p 95 (1885). Ephippiomyra bilineatum, Brunetti, Rec. Ind Mus. 1, p 115 (1907).

♂ ♀. Head eyes of ♂ with rather dense brown pubescence. contiguous for about the same distance as from lowest point of contact to base of antennæ, vertical triangle rather small, with blackish-brown hairs; from and face black, with dense, white or whitish, rather long pubescence; occiput black, margin with minute snow-white pubescence, which nearly disappears at the sides and becomes longer on lower part; proboscis with very large dark brown labella; palpi blackish, pubescent. Antennæ with first two joints black, bristly; 3rd to extreme tip of style about one and a half times as long as 1st and 2nd together, dull brown, elongate, conical, with three distinct broad annulations, bare, after which it narrows abruptly and bears some distinct hairs and is produced into a very narrow terminal style. In Q, from about one-twelfth width of head, sides parallel, shining black, with a small patch of white pubescence in middle Thoras shining black or blue-black, closely punctulate; dorsum with blackish-brown pubescence and two moderately wide well-separated stripes from anterior margin to hind margin, or even indistinctly carried over part of the scutellum, composed of very short whitish-grey pubescence, humeri rather prominent, shining bright brown, bare, sides of thorax shining black, mainly covered with longer or shorter whitishgrey pubescence Scutellum concolorous with dorsum, hind margin with a little grey pubescence; the spine at each hind corner strong, long, black, and pubescent Abelomen shining black or blue-black, closely nunctulate, with dark brown pubescence on dorsum and longer whitish-grey pubescence at sides and on the concolorous venter, a tendency to form a hair-spot towards sides of each segment, especially on 3rd and 4th; underside of last segment bare, shining Legs black, shortly grey pubescent; tips of tarsi brown below Wings with base narrowly, costal cell, base of 1st basal cell and the avillary cell, clear, rest of wing dark brown, a little paler on hind margin, 5th vem rather more deeply infuscated; halteres pale yellow.

Length, 9-14 mm.

Described from several specimens in the Indian Museum Tenasserim (*Doherty*), Semarang, Java, viii. 1909, and Depok, Java, x. 1907 (*Jacobson*).

## Genus NEGRITOMYIA, Big.

Numitomyia, Bigot, Bull Soc Ent Fiance, (5) vii, p lvaiv (1877) Negritomyia, Bigot, Ann. Soc Ent. France, (5) ix, p 190 (1879).

GENOTYPH, Ephappium maculapenne, Macq, by original designation.

Autenna nearly cylindrical, base a little pubescent, 1st and 2nd segments subequal, 1st much shorter than 3rd, arista apical, about as long as the whole antenna, densely, shortly, and uniformly pubescent. Eyes contiguous in  $\sigma$ , distinctly apart in  $\mathfrak Q$ , densely pubescent in both sexes. Thorax with a long spine on each side; scutellum with two long spines. Wings with four endings to the 4th longitudinal vein, all reaching the border.

Range. Africa, Ceylon, Malay Archipelago, Australia.

# 22. Negritomyia maculipennis, Macq.

Ephippium maculipenne, Macquart, Dipt. Exot. Supp. iv, p. 54 (1849), &.

Nem itomyra maculipennis, Brunetti, Rec. Ind. Mus 1, p. 114 (1907), & vn. p 451 (1912).

2. Head black, with a little short whitish pubescence; eyes black, shortly pubescent; from at vertex about one-fifth the width of the head, widening at level of antennæ to nearly one-third; an indistinct whitish mark above each antenna, palpi black, with

short vellow pubescence; back of head black, posterior orbit of eyes with narrow silvery-white pubescence Antennæ blackish, unner side of 3rd joint pale, style closely pubescent. Thorax black, moderately shining, with very short black hairs, covered with microscopic grey hairs, except along a broad median line and on two large spaces towards each side of the dorsum, i. e, one behind the shoulder and above each wing, sides of thoiax shining black, with microscopic grey pubescence below shoulders and some short snow-white hans above the fore coxe, there is also a rather wide perpendicular side-stripe of similar pubescence above the middle coxe, joining the dorsal pubescence in front of the wing; side-spines short, strong, black Scutellum black, with short black hans and concolorous grey pubescence, and two broadly separated. strong, short, black spines on hind margin Abdomen black, with grey pubescence forming a broad dorsal line on hinder half and a subtriangular spot towards each side of each segment Venter shining black, practically bare Legs black, with very minute whitish pubescence, basal fifth of anterior temora and basal fourth of hind pair, also major portion (from the base) of all the tarsi. Wings subhyaline, stigma dark brown. pale yellowish white roughly oval, very distinct, tip of wing from outer side of discal cell, thence in a straight line to the costa and extending hindwards, until filling the 2nd posterior cell, distinctly brown, the colour filtering more or less into the 3rd posterior cell, halteres with stem yellow, clubs dark brown

Length, 11 mm

Redescribed from a single perfect 2 in my collection from Kandy, Ceylon, viii. 1908 (Green); Pollibetta, Coorg, x-xi. 1915 (Fletcher) Loew's maculipenms (1856) from South Africa is a different species.

# Genus RUBA, Walk.

Ruba, Walker, Proc. Linn. Soc Lond. 1v, p 100 (1860).

GENOTYPE, Ruba inflata, Walk, by original designation.

Body thick and broad, head much narrower than thorax; proboses and palpr very short. Antennæ nearly as long as breadth of head, "3rd joint broader and longer than the flagellum, of which the joints are short, compact, and minutely setulose".\*

Thorax a little longer than broad, scutellum unarmed, abdomen globose, very much broader and a little longer than thorax. Legs short. Wings moderately broad, "1st cubital vein not one-third of length of 2nd, four complete externo-medial veins; subanal vein curved, joining the anal vein at some distance from the border, discal areolet elongated exteriorly, irregularly triangular, exterior side very short."

Range, India, Celebes, Papua.

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<sup>\*</sup> Walker's "flagellum" is the style.

#### 23. Ruba inflata. IVall.

Ruba inflata, Walker, Proc. Linn. Soc Lond 1v, p 101 (1860)

Q. Head from and face one-third of head, uniformly wide except for a slight contraction slightly above base of antenna, ocellar triangle very small, black; an oval brown longitudinal mark on from just above the orange antenna, of irregular shape, continued as a fine line to the ocellar triangle, whole head brownish orange, proboscis with very large labella, tips of palpirounded, flattened, rather large, deep black,\* whole head with rather short, moderately dense, but not conspicuous, vellow pubescence. Thorax and scutellum all brownish orange, with rather dense vellow pubescence, traces of three longitudinal narrow blackish Abdomen brownish orange, with yellow pubeslines on dorsum Legs vellowish orange, with yellow pubescence; apical half of hind tibie black, with black pubescence, the tiny bristles at the tips of the tarsi give them a blackish appearance Wings pale yellow, apical half (except extreme tip) rather bright brown, darker anteriorly; a quadrate dark brown spot of moderate size at tip of 1st basal cell, extending to the costa, anterior margin of basal half of wing a little deeper yellow.

Length, 9 mm.

Described from a perfect female in the Indian Museum from Ghumti, Daryling District, 1000 ft., vii. 1911 (Gravely), and one in inferior condition from Kohima, Assum.

Walker described the species from Makasar, in Celebra, and the only descrepancy is that he says nothing about the black apical half of the hind tibix.

# Genus CLITELLARIA, Mg

Citellaria, Meigen, Illig Mag 11, p. 265 (1803)

Addromyria, Kertész, Ann Mus. Hung v, p 499 (1907); nom nov.
for Citellaria, Sch., nec Mg

GENOTYPE, Chiellaria dahlir, Mg (Europe); designated by Bezzi, Wien. ent. Zeit xvii, p. 75 (1908). †

Head. eyes densely pubercent, contiguous in male, wide apart in female, proboscis retracted, with moderately broad labella; palpi 2-jointed, 1st joint thick, kidney-shaped, 2nd narrow, conical; epistoma slightly arched. Antenno elongate, 1st and 2nd joints subequal; 3rd elongate conical, with four annulations, with two-

\* The palpi he along the lower side of the face and the conspicuous black tips look like two black spots on it, Walker evidently instaking them for such

as he mentions "a black spot on each side of the mouth"

1 [It seems necessary to point our that this designation is entirely at variance with the generally accepted rules of zoological nomenclature. Meigen, when describing \*Chitellaria\*, definitely designated \*ephippium\*, F., as the genotype, and no subsequent action on the part of Meigen himself or anyone else can alter that fact. The correct designation for the present genus is therefore \*Adoxomyra\*, Kerk., and the species described above (p. 46) as \*Ephippium bilineatum\* should stand as \*Chitellaria bilineata\*, F.—En.]

jointed apical style, 1st very short, 2nd long. Thorax elliptical, moderately arched, scutellum with two spines, often small and indistinct Abdomen a little broader than thorax, oval or elliptical, rather well arched, 5-jointed, genitalia small Legs moderately long and strong Wings with normal venation, 3rd ven distinctly forked, 4th vein with three endings; posterior cross-vein absent, as upper branch of 5th vein forms part of lower side of discal cell

Range Europe, Western Asia, North Africa, Orient, North

America.

Life history That of the common Indian C heminopla, Wied,

has been worked out at the Pusa Institute.

Some confusion has arisen over the name Chiellana notes that it was established by Meigen in 1803 for cphippium, F., and that that author subsequently (1822) enlarged the scope of the genus, including in it villosa, F., calva, Mg, and pacifica, Hfg, as well as ephappium, F Latreille in 1804 erected Ephappium for the species of that name,\* and, as was customary in those days in such cases, changed the specific name to thoracicum to avoid redundancy. Therefore the name Clitellaria must stand for the remainder of the species placed in it by Meigen or, at the very least, for one of them. C pacifica is an Odontomyia and synonymous with hmbata, Wied, which leaves only villosa and calva, one of which should be the type of Chitellaria, Mg. Kertész retains Meigen's original sense of the genus (i.e., for ephippium,  $\mathbf{F}$ ) in his Kat Dipt (1908), but adopts the madmissible name Potamida (Mg 1800) for it Meigen added dahlir in 1830 to Chiellaria and Kertész has renamed this group of species Adoxomyia. Lasiopa, Brullé (1832), differs from Chtellaria, Mg, in having an unspined scutellum, and both villosa and calva have been placed in it Therefore Chtellaria, as understood by Meigen, was by this time reduced to the single species dalli, and this species is designated by Bezzi as the genotype. Kertész's "Potamida, Mg" must continue to be known as Ephippium, Latr., Adoxomyia, Kert., is the true Clitellaria, Mg., and must retain this latter name; and Lastopa, Brullé, is a good genus.

The two Indian species are separated thus:---

Thorax without definite hair-stripes, but with a darker median stripe surrounded by four spots 

brown hairs

hemmopla, Wied. bistriata, Biun.

## 24. Clitellaria heminopla, Wied. (Pl. I, fig. 14.)

Clitellaria hemmopla, Wiedemann, Zool Mag. 111, p. 30 (1819); id., Auss Zweifl. n, p. 48 (1830), Bruneth, Rec. Ind. Mus. 1, p. 120 (1907).

♂♀. Head: eyes in ♂ practically contiguous for about half the distance from vertex to frontal triangle, black, upper facets

<sup>\* [</sup>This is not strictly accurate (see footnote on p. 45).—En ]

barely larger than lower ones, not clearly demarcated, with moderately short dense pubescence, which appears groy or brown according to the point of view, vertex black, with a few long whitish hairs, ocelli reddish; frontal triangle black, with rather long soft whitish hair, face and lower part of head black, with greyish-white pubescence; proboscis dull yellowish; palpi reddish brown, antennal 1st and 2nd joints black, 3rd joint reddish brown to yellowish, first four annulations much broader and more distinct than the rest, which form a narrow blackish cylindrical tip, a reddish-brown ring round base of antennal prominence. In Q, from torming  $\frac{1}{4}$  to  $\frac{1}{5}$  width of head, a little narrower at vertex, with short whitish-grey or brownish-grey pubescence, lower part of from slinning, practically bare, except for a bunch of drooping whitish hairs near each eye-margin above level of antennæ; the four basal annulations of 3rd joint rather broader Thorax black, dorsum wholly covered with whitishthan in 3. grey tomentose pubescence, in perfect specimens, if viewed from in front, a median stripe surrounded by four spots arranged in a square can be seen, composed of gold-brown tomentose pubescence, some longer whitish-grey hairs below shoulders Scutellum large, with grey and golden-brown admixture of tomentose pubescence, spine placed at each hind corner, yellowish brown; a fringe of white hairs depends from the hind maigin. Abdomen black; 2nd segment wholly, 3rd narrowly on hind margin and more broadly towards sides and along side-margin of segment, 4th broadly on hind margin (especially towards and along the side-margins), 5th with a large median triangular spot (its base on hind margin of segment), very shortly but distinctly whitish (occasionally rather golden) pubescent, ground-colour of extreme side-margins of segments brownish orange; venter blackish, with extremely short whitish pubescence. Legs: coxe black, brownish orange at tips, hind pair brownish orange behind; femora and tibiæ rather shining black, the former brownish orange at base and narrowly at tips; tibie broadly brownish yellow at base, narrowly brown at tips; trant tars: blackish, posterior metatars: yellowish, remaining joints brown, all legs with short greyish pubescence, which is more brownish yellow on tarsi, especially the front pair. Wings grey, yellowish brown about the centre; stigma slightly darker brown: halteres vellow.

Length, 63-9 mm.

Described from a long series of both sexes in the Indian Museum, Pusa collection and my own, from many parts of India and Ceylon, where it appears to be generally distributed and common from March to October on rotten papaya-stems, plantains, and melons.

Mr. Howlett has taken it "at sex play around dead leaves, Pusa, 15. iii, 1912."

Larva. This is 11 mm. in length, whitish, oblong, the 4th segment truncate, the three anterior segments much narrower and apparently withdrawable into the 4th; 1st segment rather elongate, very narrow, 4th to 12th segments about equal in length,

anal segment longer, rounded at tip; each segment bearing a transverse row of rather long curved yellow bristles on both upper and under sides, one or more being also present along the sides. The surface is covered with minute white particles, apparently purposely attached to its body. Found in rotten papaya-stems.

#### 25. Chtellaria bistriata, Brun.

Clitellaria bistriata, Brunetti, Rec. Ind Mus vii, p 452 (1912)

3. Head with vertex wholly occupied by the ocellar tubercle, black, shortly black pubescent, occiput blackish, the orbit bare, but a little whitish-grey hair on lower part; eyes closely contiguous, with dense dark brown hair, frontal triangle black, a little whitish-grey hair on its uppermost part, underside of head with whitish hair. Antennæ black, normal. Thorax black, with minute black pubescence, the anterior margin and two moderately wide dorsal stripes extending from the anterior margin to the scutellum, bearing very short golden-brown hairs, these hairs also appearing on, behind, and below the shoulders; at the extreme lower anterior corner of the dorsum is a reddish-brown, bare, prominent, but very small callus; some greyish hair on posterior corners of lower part of thorax Scutellum rather broad, black, with microscopic black pubescence, some longer black hairs above and ragged dirty grey hair on underside; a slightly curved, moderately long, obtusely pointed spine at each extreme posterior Abdomen black, microscopically pubescent, with some very short greyish pubescence towards the sides, rather more extensive on first two segments, on posterior margin of penultimate segment, and covering most of the last segment. Venter black, with very short greyish pubescence Legs black, with microscopic pubescence, and some very short greyish-white hair on underside of anterior femora; the pubescence on the lower side of the tars: dark brown. Wings with anterior part deep brown, becoming a little lighter on posterior two-thirds, but still dark brown, stigma small, blackish brown, veins deep black halteres black, stem vellowish.

Length, 8-9 mm

Described from a 3 from Bhowali, Kumnon District, 5700 ft. (D. A. D. Imms), now in the Indian Museum, Shillong, 4900 ft., 31. v. 1918 (Rao)

#### Genus LASIOPA, Brullé.

Lastopa, Brullé, Expéd Motée, 11, pt 1, p 307 (1832) Cyclogaster, Macquart, Hist. Nat. Dipt 1, p 256 (1834) ? Inci myra, Bigot, Ann Soc. Ent. France, (3) 11, p. 82 (1856) ? Incima, Bigot, op cit (3) vii, p. 210 (1859)

GENOTYPE, Lasiopa peleteria, Brullé (Europe).

Head with epistome arched, but not snout-like. Antenna rather long, 1st and 2nd joints subequal, 3rd elongate, conical, with four annulations, ending in a two-jointed style. Eyes very harry, quite

or practically contiguous in 3, broadly separated in 2. Probosus short or lengthened, porrect, with moderately large labella, palpi with three distinct joints. Thoras elliptical, scutellium unarmed Abdomen broader than thorax, elliptical, arched, five-segmented Legs moderately long and stout. Wings with 3rd vein distinctly forked, 4th longitudinal vein with four faint veinlets, of which the 4th originates near or directly from the 2nd basal cell.

Range Europe, West Asia, North Africa, South Africa, Orient,

New Zealand. South America

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Life-history unknown. The perfect insects occur on umbelliferous and other flowers, and otten become rather sluggish in their habits.

## 26. Lasiopa villosa, F., vai himalayensis, Brun

Nemotelus villosa, Fabricius, Ent. Syst. iv, p. 270 (1794). Lasiopa villosa, var himalayensis, Brunetti, Rec. Ind. Mus. 1, p. 117 (1907).

of Plead black, with rather long, shaggy, yellowish-grey hair; eyes in 3 not quite contiguous, from in 2 one-third width of head, sides parallel, with rather long golden-yellow pubescence; face similar, with a rather small elongate spot on each side in 2 at level of antenna, contiguous to inner margin of eye, proboscis dark brown, not prominent; underside of head with greyish pubescence, antenna blacksh brown Thoras black, with yellowish-grey pubescence, which is shorter in the 2. Abdomen black; an elongate yellowish spot towards each side on hind border of 2nd, 3rd, and 4th segments, all the spots subequal, 5th segment with distinct yellow hind margin. Legs blackish brown. Wings brownish grey; halteres whiths yellow

Length, 9-10 mm.

Described from three specimens in my own collection from Mussoorie, v. 1905 (Brinetti), and others from Kumaon, W Himalanas, 6300 ft., 11.v. 1911 (Kemp), Naim Tal, vi 1893 [Lucknow Museum]; Dungagali, Hazara Dist, 8000 ft., 21-24. v. 1915 (Fletcher).

The only difference from typical European specimens is that the abdominal yellow spots are not turned up and widened at

their inner ends

# Genus OXYCERA, Mg.

Orycera, Meigen, Illig Mag. ii, p. 265 (1803). Hypoleon, Duméril, Expos Moth. Natur. (1801)

Heteroxycera, Bigot, Ann Soc. Ent France, (3) 1v, pp. 68 & 85 (1856)

(HENOTYPE, Musoa hypoleon, L (Europe), by designation of Curtis, 1833 (as trilineata, F.).

Head with epistoma smooth, a little arched; eyes from bare in both sexes to densely pubescent in 3 (in which case 2 has some pubescence too), contiguous in 3 for a considerable distance, the

upper facets much larger than the small lower ones and generally sharply delimited from them, in 2 wide apart, with uniform facets; occiput with lower halt considerably puffed out. Probosois retracted, with broad labella, palpi rather inconspicuous. Antennæ elongate, first two joints subequal, 3rd spindle-shaped or peg-shaped, with four annulations and a two-jointed apical or subapical bristle. Thorax oblong, rather arched, moderately pubescent; humeri and posterior calli prominent, scuttellum with two spines. Abdomen short and round, very arched, 5-segmented. Legs sample, short, weak. Wings with normal venation, 3rd longitudinal vein forked or simple, 4th vein with three endings, the 3rd often weak or absent, posterior cross-vein absent, upper branch of 5th vein forming part of lower side of discal cell, the latter often indistinct: alulæ well developed

Range Europe, Asia, North America, and one species from Caffrana

Life-history. The larva lives in most mud among Conferme. The flies frequent leaves and flowers in the sunshine near streams and damp situations, where they are very active; on sunless days they settle on the underside of leaves near the ground. The metamorphoses of several European species are well known.

These insects are rather small, nearly bare, flies, generally of a

black colour with conspicuous yellow spots.

O. signata is mainly a black species and O. albomicans a yellow one

# 27 Oxycera signata, sp nov.

Head eyes with dense brown pubescence, configuous for a considerable distance, leaving vertical and frontal triangles about equal in size, black, former with black hairs and three brownish ocelli on an elevated prominence, latter bare, shining; face black, with a long oval patch of short snow-white pubescence adjacent to the eye-margin on each side, no postocular orbit; occiput black, proboscis orange-yellow, underside of head with short white hans Antenna black, first two joints subequal, 3rd as long as first two together, with four annulations and subapical Thorax slinning black, with moderately dense brownishgrey pubescence, a pair of widely separated, pale yellowish, narrow, longitudinal dorsal stripes, not quite reaching either anterior or hind margin of dorsum, an elongate bright lemonvellow spot on each side of dorsum from prothorax up to the suture, and a large orange-yellow one on each posterior angle of dorsum, pleuræ black, with whitish pubescence and a callus-like long yellow stripe from prothonax (where its end is contiguous to the stripe on the side of the dorsum immediately above it) to root of wing Scutellum bright lemon-yellow, with brown pubescence, hind margin black; metanotum shining black, microscopically Abdomen black, moderately shining, with micropubescent. scopic brown pubescence and a little white hair at sides of 1st segment, which latter is narrowly yellow at base; a large subtriOXYCERA. 55

angular spot on 3rd segment on each side-margin reaching from anterior nearly to posterior margin; a smaller oblong one placed endways at middle of side-margin of 4th segment; and a small semicircular apical one on last (5th) segment, venter black, with a little sparse pale pubescence. Legs black, with the following parts yellow: tips of femora broadly and posterior pairs indistinctly at base, front tibbe broadly at base, middle pair wholly and hind pair narrowly at base and tip, also posterior metatars, and 2nd joint of hind tars, all legs increscopically pubescent. Wings colourless, anterior veins and stigma pale yellowish; halteres bright yellow.

Length, 5 mm.

Described from a single of in the Pusa collection from India, probably from Mussoorie

Type presented to the British Museum.

### 28. Oxycera albomicans, sp nov.

Q. Head wholly bright sulphur-yellow. From and face fully one-third of head, very slightly narrower at about middle of frons, from rather broader on lower part, eyes bare, upper eye-margins of from narrowly black; a thin line running from the corner of each eye diagonally to vertex at each side of vertical spot, an elongate black spot on vertex, embracing the ocelli, pointed at anterior end, an oval or leaf-shaped one of moderate size in middle of frons and a small elongate, vertically placed one immediately above base of antennæ, the latter wholly brownish orange, of normal size, arista black, lower sides of face (viewed from above) with snow-white shimmer; mouth-region and proboseis brownish orange, postocular orbit very broad, lower part with whitish shimmering tomentum and microscopic pubescence, occi-Thoras sulphur-yellow, microscopically punctate, with put black very short yellow pubese nee; dorsum with three longitudinal black stripes, the median one slightly the widest and reaching front margin, the side-stripes just failing to reach it—all three narrow and united on hind margin, a small black vitta just above wing-Lower part of thorax, front part of sternopleura and a contiguous triangular spot on mesopleura, black; pleura and lower part of thorax with a little microscopic white pubescence. Scatellan yellow, with a little microscopic black pubescence, spines rather long, tips a little darker. Abdomen sulphur-yellow, microscopically punctate, emarginations of segments very indistinct; two broad black transverse bands, broader still in the middle of each, lying apparently over the junctions of 2nd and 3rd segments and of 3rd and 4th segments respectively, united by a short black median stripe; the anterior transverse band broadly united to the convex side of a semicircular band, which has its ends on the anterior corners of the 1st segment, but just failing to attain the actual margin; hinder transverse band united by a median black longitudinal stripe to an arched narrower black transverse band placed on base of 5th segment, the middle part encroaching over hind margin of 4th segment Venter yellowish, with microscopic pale vellow pubescence Legs vellow or brownish vellow; front tars wholly, apical half of middle pair, hind tibies (except at tips), and last four joints of hind tarsi dark brown. Wings colourless; veins yellowish; 3rd vein forked towards tip, halteres bright yellow.

Length, 41 min

Described from two 2 2 from Abbottabad, NW Frontier Province, vi. 1916 (Fletcher)

Type sent to the British Museum, co-type in Pusa collection. The abdomen might equally well be described as black with the base narrowly and tip more broadly yellow, and three pairs of yellow side-spots, the first pair triangular, the 2nd and 3rd pairs much larger and irregularly oblong.

# Subfamily STRATIOMYINÆ.

Head short, rather flattened in front; antenna with 3rd joint elongate, no arista. Thorax subquadrate, often only slightly arched; scutellum generally with two spines. Abdomen 5 to 6segmented, generally subquadrate, not much longer than thorax, often much flattened and frequently with obvious pale markings. Legs of moderate length and strength, or somewhat weak. with 3rd vein generally forked, ending far before wing-tip; 4th vein with three terminations or veinlets, seldom reaching wingmargin, one or more often absent or extremely weak, posterior



Fig 2.-Stratiomina, autenna.



Fig 3 -Odontomyia, antenna

cross-vein present, so that the 5th vein never forms any part of the discal cell, anal cell closed near wing-border, 5 posterior cells, united on wing-margin. Wing in repose folded closely over middle of alidomen, leaving side-margins exposed, alar squame small, thoracic pair large, pubescent.

The principal characters of this subfamily taken in conjunction are the subquadrate abdomen of the typical genera (Stratiomyna, Odontomyia), the elongate antennæ devoid of arista, and the presence of the posterior cross-vein. Larva peripneustic, last

segment more or less long and narrow.

# Table of Genera.

 Third antennal joint with at most six annulations Third antennal joint with seven or eight annulations . . . . . CYPHOMYIA, Wied., p. 57. 2 First antennal joint three or more times longer than 2nd .

Eight antennal your loss than three

First antennal joint less than three times as long as 2nd, generally STRATIOMYIA, Geoff, p. 58

ODONTOMNIA, Mg, p 61

The above distinctions are purely arbitrary, but each genus has a facies peculiarly its own, which the student will soon recognise.

#### Genus CYPHOMYIA. Weed

Cyphomyia, Wiedemann, Zool. Mag 1, p 3 (1819)

GENOTYPH, C auriflamma, Wied. (Tropical America); designated by Brauer, 1882

Head as broad as thorax, semicircular, eyes bare (occasionally just perceptibly hairy), in & closely contiguous for a considerable distance; from in & rather broad, sides approximately parallel, postocular orbits in 2 broad. Antenna with 1st joint moderately long, broader at tip, and cup-shaped, half as long as 1st, 3rd cylindrical, tapering, of eight subequal annulations, practically Thorax considerably elongate, much narrowed in front, moderately arched, anterior corners rather angular; in many species with three lighter longitudinal stripes Scutellium inther large broader than long, trape/oidal, with two spines that are longer and more divergent in & than Q. Abdomen subglobular, thick, about as long as thorax, 5-segmented; 1st segment very short, mostly hidden by scutellum. A generic peculiarity is the presence of hair-spots towards the sides of the last segment, placed on its anterior margin. Legs rather long, especially the femora, simple, slender; taisi generally longer than tibia. Wings fully developed, considerably longer than abdomen and folded over it when at rest

Range North, Central and South America, South Africa, India, Sumatra.

# 29. Cyphomyia indica, sp. nov.

Hadd wholly bright orange, bare, including the thick postocular orbits, which are distinctly demarcated from the vertex by a narrow groove; from about one-third width of head, barely broader at vertex; underside of head with a little short white pubescence towards the eye-margins, eyes and probosois black. Antennes with 1st and 2nd joints dark reddish brown, 3rd black, with eight distinct annulations, three times as long as 1st and 2nd together. Thorax deep black, with rather doines short grev and brownish-grey pubescence, which is a little longer and more whitish posteriorly and on the concolorous, rather large, nearly oblong scutellum; spines of latter tipped with brown; pleure blackish with a little whitish pubescence. Abdomen much broader than thorax, nearly circular, brilliantly shining violet-blue, with very short whitish pubescence; venter similar. Legs black, with whitish pubescence; knees barely perceptibly brownish orange;

more than basal half of front metatarsus, and the hand metatarsus wholly, and most of the succeeding joints brownish orange, pubescence of legs black Wings uniformly rather dark brown, a little lighter at base and darker about the stigma; halteres pale dull orange.

Length, 9 mm

Described from a unique specimen (genital organs missing) in the Indian Museum from Kalimpong, 600-4500 ft., Dariling District, 1v-v 1915 (Gravely)

## Genus STRATIOMYIA, Geoff

Stratumys, Geoffroy, Hist. d Ins. n, p. 475 (1704) \*

Stratiomys, Fabricius, Ent. Syst 1v, p. 262 (1794), Meigen, Illig Mag 11, p 265 (1803)

Stratiomyra, Macquart, Dipt Exot 1, pt 1, p 179 (1838), Brunetii, Rec Ind Mus 1, p 125 (1907)

Hoplomyu, Zeller, Isis, xi, p 882 (recte 828) (1842) Stratrotomyra, E L Arribalzaga, Bol. Acad. Nat Cienc Cordoba, iv, p 128 (1882)

Genotype, Musca chamæleon, L (Europe), by designation of Latreille, Consid Gen. (1810).

Head semicircular, face arched, postocular orbits thickened, especially in Q, proboses comparatively small, palpi small; eyes in & practically configuous, the upper facets often much larger than lower ones, wide apart in Q, in both sexes either bare or hairy, sometimes a sexual character. Antennæ approximate at base, diverging after 1st joint, which is very much longer than 2nd, 3rd joint elongate, cylindrical, baie, with five or six annulations (occasionally an annulation subdivided) Thoras subquadrate, broader behind, pubescent; scutellum two-spined. Abdomen broader than thorax, slightly arched, subquadrate, shoulders angular, whole dorsum sparsely, moderately, or somewhat densely pubescent, wings lolded one above the other at rest, lying within the side-margins of the abdomen, genitalia Ligs moderately stout, shortly pubescent. Wings mainly as in Odontomma, 3rd vein torked, 4th vein terminations (three) long, curved, nearly reaching wing-margin, the hindmost more or less parallel with upper branch of 5th vein, posterior cross-vein present but sometimes small; anal cell closed near wing-margin; alar squamæ small, thoracic large and pubescent.

Range World-wide except Australia and the Ethiopian Region. Life-Instory. Metamorphoses of more than one European species known Larvæ fusiform, broadest before the middle, known as

<sup>\* [</sup>In this work Geoffrey did not accept the himary system of nomenclature upon which all our modern zoological classification is based, it has therefore been ruled that all generic names therein proposed by him are just as invalid as pre-Lunnan names The authorship of Stratiomy's should thus be attributed to Fabricius —En ]

"rat-tuiled maggots," some are aquatic, hanging head downwards by their tails, probably living on minute organisms, some live in mud or moist said. The pupa floats free. The imagines frequent Umbelliters in moist situations

## Table of Spears.

1 Hind margin of 3rd and 4th abdominal segments with uninterrupted yellow band. Hind margin of 3rd and 4th abdominal segments with a pan of elongate spots, well separated.

fulvescens, sp n 1 segments parated 2.

2 Thoracic pubescence moderately thick and long, scutellum black, except the narrow yellow hind margin and spines, 2 with two conspicuous yellow postvertical spots, sometimes united ...

Thoracic pubescence extremely short and spaiser, scutellum all brownish yellow, 2 with no postvertical yellow spots

barca, Walk

miciopilosa, sp. n.

### 30. Stratiomyia barca, Walk

Stratzomys barca, Walker, List Dipt Brit. Mus. 111, p. 530 (1849) Statzomysa barca, Brunetti, Rec. Ind. Mus. 1, p. 125 (1907).

Head eyes contiguous in & for more than half their height, shortly and sparsely pubescent, upper facets distinctly but not greatly larger than lower ones, vertical triangle black, with a few yellow hairs; ocelli large, brownish, antenne black; from, face (punctulate), and lower part of head black, with long, rather shaggy, bright yellow hair; occiput black, with very sparse pale pubescence, hind margin of eyes with a fringe of microscopic yellow pubescence. In 9, from and face nearly half width of head, sides parallel, black, behind vertex two conspicuous bright yellow oval spots, sometimes united as a large semicircular spot; two very large elongate yellow calls on from placed diagonally, the muer ends nourly contiguous, the outer ends touching eyes and descending below level of antenno; colour of calli extended to sides of face broadly, a broad median black stripe on face, which is covered with whitish pubescence, posterior margin of eyes with merely an extremely short fringe of whitish pubescence, a considerable thickening of the orbit on lower half, where it is yellow. Thorax black, punctulate, slightly shining, closely clothed with dense, rather long, brownish-yellow pubescence, which is much paler on pleure; scutellum smular, hand border and spines brownish yellow. Abdomen black, slightly shining, with an elongate moderate-sized yellow spot on hind border at sides of 2nd segment, and elongate spots similarly situated on 3rd and 4th segments; 5th segment with a elongate yellow spot, often paler than the others, placed longitudinally, not attaining antenor margin but extended at lower end for a short distance each way on hind margin of agment. Pubescence in & brownish yellow, dense and fairly long over all the surface; in 2 black, dense but

very easily overlooked, a little pale yellowish-white pubescence about the shoulders, sides, and tip. Venter in  $\sigma$  with greater part of centre of each segment and the hind border yellowish, lest black, in  $\mathfrak P$  the yellow part is much paler or even whitish, and of much less extent, in some specimens almost confined to hind borders except on the 2nd segment Legs mainly black, knees more or less broadly brownish vellow; hind tibus pale brown with a more or less distinct, moderately narrow ring at middle and tip, all tarsi brownish yellow, a little darker above at tips, pubescence on legs vellow. Wings pale grey—anterior and basal parts brownish or yellowish brown, limited by discal cell and anal cell, halteres pale yellow, occasionally green.

Length, 10-12 mm.

Described from several of each sex in the Indian Museum, Jhelum Valley, 5200 ft., and Srinagar, 6000 ft., Kashmir, vn-ix 1916 (H. T. Peurse) Described originally from China

Type in the British Museum

## 31. Stratiomyia micropilosa, sp. nov.

Q. Very near barca, Walk, differing as follows :-

The large vellow postvertical spot is entirely absent, as are the two elongate frontal ones, the latter being replaced by a rather obscure subquadrate median chestnut spot just above antennæ; lower posterior orbit of eyes whitish, not yellow. The dull yellowish pubescence on dorsum of thorax almost microscopic and much sparser, scutellium wholly yellowish, with concolorous tomentum. Abdominal spots brownish orange, side-spots on 2nd segment more triangular, their upper angles only just touching front corners of segment, those on 3rd segment similar but slightly smaller, those on 4th segment smaller still, but partaking more of the nature of a triangular spot than a linear one as in barca. Tibiæ more narrowly pale at base, hund pair similar to anterior tibiæ.

Lempth, 12 mm

Described from a single  $\mathfrak P$  in the Indian Museum from Maymvo, Burma, v 1910 (II L Andrewes).

# 32 Stratiomyia fulvescens, sp. nov.

d Head with eyes shortly but not conspicuously pubescent, the very narrow inner orbits contiguous for about half the distance from vertex to frontal triangle; vertical triangle black, clevated, with some brownish-jellow hairs; ocelli dull jellowish, frontal triangle small, black with brownish hairs, face and head below antennæ wholly black, with rather thick and long whitish-grey pubescence; occiput black, with grey pubescence, no definite posterior orbit to eyes; proboscis brownish yellow. Antennæ black, tip of 2nd joint dark brown; 1st joint about five times as long as 2nd; 3rd a little longer than first two together. Thoraw

wholly black, dorsum entirely covered with dense yellowish-grey pubescence, and sides with the pubescence a little paler. Scutellum black, with yellowish-grey pubescence; hind margin broadly brownish yellow, spines concolorous, with rather long whitish-grey pubescence about their bases Abdomen moderately shining black, with rather dense, brownish-yellow pubescence on dorsum of 2nd, 3rd, and 4th segments, the pubescence paler on anterior corners and whitish on 5th and 6th segments. A rather large triangular orange spot on hind border towards each side of 2nd segment, the inner end of each narrowed to a fine point, the base of the spot placed on the side-margin but extending only halfway to the anterior margin, hand margin of 3rd segment orange, the colour very narrow in centre of segment, much broader towards sides but narrowed again just on side-margin; a similar orange hind margin to 4th segment and a fair-sized orange triangular spot on 5th, with its base on hind margin, 6th segment all orange, the extreme side-margin of all segments orange, except the anterior half of 2nd segment Gemtaha brownish orange, small, apparently consisting of a median cylindrical piece and a small lamella on each side Venter with 2nd segment wholly, 3rd broadly, and 4th narrowly on hind margins, brownish orange. Legs black, with grey pubescence on femora and tibia, yellowish on taisi, tips of all femora, basal half of hind pair, base and tips of anterior tibie, hind tibie wholly, and all tarsi orange Wings pale brownish grey, veins a little darker, halteres orange

Longth 12 mm

Described from a single of from Taro, Peshawur District, NW. ludia, 16-19. v 1915 (Fletcher); presented by him to the British Museum.

Near S. barva, Walk, but in that species the abdominal orange ("tawny") spots are not united to form a band, the tibise are piecous and the legs have tawny pubescence

# Genus ODONTOMYIA, Mg.

Odontomyia, Meigen, Illig Mag n, p. 205 (1803), Brunetti, Rec. Ind. Mus. 1, p. 126 (1907).

Opseogypmus, A. Costa, Il Giamb. Vico Napoli, n. p. 443 (1857) Psellidotus, Rondani, Arch. p. 1 Zool Modena, in, p. 78 (1863). Eulalia, Kertész, Kat. Dipt. m., p. 62 (1908).

GENOTYPE, Musca hydrolion, L. (Europe); by designation of Westwood (1840).

Head about as broad as thorax, transverse; eves rather flattened, bare or hairy, contiguous in  $\sigma$ , upper facets larger than lower ones, broadly separated in  $\mathfrak{P}$ ; face prominent, pubescent; proboscis rather long; palpi small, cylindrical. Antenne with first two joints short, 1st longer than 2nd; 3rd much longer, cylindrical, tapering, with four to six annulations, last two sometimes

forming an apical style, with or without a minute terminal bristle (fig 2) Thorax subquadrate or oblong, scutellium with two spines. Abdomen 5-segmented in \$\sigma\$, 6- or 7-segmented in \$\sigma\$, normally barely broader, sometimes much broader than thorax, generally nearly bare, generales small. Legs simple Wrigs of normal Stratiomyid type; anterior veins crowded together, 1st and 2nd veins almost anastomosed, 1ather short, 3rd vein normally forked, both branches ending far before wing-tip; 4th vein with three endings, of which one or more may be incomplete or absent; posterior cross-vein present; squame distinct, thoracic pair pubescent

Range World-wide.

Life-listory. One or two European species have been bred, and O cyanea at Pusa. Larva much as in Stratiomyia, but without spine-shaped protuberance. The imagines occur in moist situations, with a partiality for settling on Umbelliferæ.

### Table of Species.

1	Shining metallic-blue species (with a general	
	resemblance to the Muscid, Chrysomyra	44411 mg mg mg (, )
		cyanea, sp n, p 63.
	Never metallic, always yellow or brownish,	2.
ถ	with markings	
، ئىد	Abdomen as well as thorax conspicuously	[p 64
	pubescent.	rufoabdommalıs, Brun ,
	Abdomen practically bare, normal, thorax	43
0	generally considerably pubescent	3
ú	Thorax with sharply defined spaces of shin-	
	ing black and reddish brown, and a short	
	golden tomentose stripe from anterior	C 05
	margin, a conspicuous and rather ab-	[p 65.
	normal species	pulcher rima, sp. n.,
	Thorax dark, with yellowish or grey pubes-	
.1	cence, species of normal appearance Some of the femora with distinct broad black	-1
4.	bands	F
		5
	No distinct femoral bands, legs generally	6
ĸ	wholly pale All femora with broad black median band,	O
Ð		
	hind tibue with broad apical band IIInd femora not banded	minuta, F, p. 65.
a		rubi ithorax, Macq.,
U	(a) Abdomen wholly orange, postocular	[p. 67.
	orbits in Q moderately broad (b) Abdomen with distinct dark transverse	lutatius, Walk., p. 70
	bands, postocular orbits in 2 mode-	
		di aniana ani ani ani ani ani ani
	(c) Abdomen with dorsal row of spots, more	transversa, sp n., p.71.
		7.
7	or less forming a median stripe	1.
٠.	Frons in of black; facial bump small,	T. 07
	blacksh; postocular orbits in Q mode- rately broad	[p. 67.
	rately broad	kashmu ensis, sp. n.,

From in 3 orange, or if black, then facial bump more or less orange, postocular orbits in 9 mappreciable.

8. From and face all orange in both sexes From and face black in both sexes, Q with facial bump brownish change.

8 [p 68. don soangulata, sp. n, solennis, Walk, p. 69

It is impossible to include virulana, Wied. (p. 72), in the table, but it falls into section 6, and my transversa may be identicalwith it.

#### 33 Odontomyia cyanea, sp. nov

 $\sigma \circ H$ ead in  $\sigma$  with eyes bare, contiguous for nearly half the distance from vertex to frontal triangle, upper facets rich brown or violet-brown, lower ones black; vertex black, with a few black hairs, the small from and the face and lower part of head bright orange, bare, shining; antennæ orange, 3rd joint from dull orange-brown to blackish, tip generally darker, twice as long as first two joints together, with four annulations and small yellowish apical style, proboscis black; eye-margins developed on inner lower edge of eyes, orange, with a little greyish pubescence, no postocular orbits, the facets running out to the extreme margin above and at sides. In 2, from one-third of head, orange, bare, just perceptibly broader at vertex and towards antonna, latter rather longer than in &; no postocular orbits Thorax deep blue, brilliantly shining metallic, closely punctulate, with microscopic grey pubescence, scutellum similar, pleure more blackish, more or less tomentose pubescent, with a little longer grey pulpescence on mesopleura and sternopleura and below shoulders. In 2 four longitudinal, silvery-grey, subequal and equidistant tomentose stripes, the two middle ones united on anterior margin; scutellum also covered with silvery tomentose pubescence men in & deep blue, shining, minutely punctulate; side-margins and tip of abdomen apple-green, sometimes only narrowly (but always continuously) so, but varying in width up to one-third of the abdomen on each side. In 2 as in d, but the green sidemargins always very narrow though continuous, but not including the tip, which is always blue in this sex, whereas in & the green tip of the abdomen is always continuous with the green side-margins. Venter wholly apple-green in both sexes. Legs black, a little silvery pubescence on outer sides of anterior time, front tarsi (especially the metatarsi) distinctly broader, thicker and shorter than middle tarsi. Wings quite clear; veins in anterior part of wing brownish orange or yellowish; stigma brownish; the 3rd of the faint veinlets issuing from the discal cell practically absent; halteres bright apple-green.

Length, 61-8 mm.

Described from a long series of both sexes, mostly bred at Pasa, 26. in. 1908, 2. in. 1909, 3-18. iii. 1909. Types sent to British Museum; co-types in Indian Museum and my collection.

## 34. Odontomyia rufoabdominalis, Bi un. (Pl I, fig 24)

Odontomyna rufoabdominalis, Brunetti, Rec. Ind. Mus ix, p 205 (1913).

3 9. Head black, a little shining: eyes bare, absolutely contiguous for a short space, leaving a very elongate narrow vertical triangle; vertex considerably prominent, with a few black hairs, ocelli pale yellowish; face but little prominent, with short black and grey hairs; antenno black, 1st and 2nd joints normal, 1st black, 2nd dull brownish (3rd missing); two small tufts of grey hairs immediately above antennæ, and a trace of grey hairs along the sides of face In 2, from one-third of head, sides parallel. and with face wholly slightly shining black, with sparse short black pubescence; the ground-colour similar to that of the thorax, ocelli very distinct, wide apart, brownish yellow, ocellar bump large, moderately elevated, month-opening, proboscis, palpi, and Thorax black, with minute white lower part of head black patches, slightly shining, dorsum and sides with moderately thick, not long, black and grey hairs, set in minute black sockets, which give the dorsum a granulated appearance, often two or three hairs emerging from the same socket; small patches or bunches of grey hairs occur around the base of the wing and on the pleure Scutellum clothed like the thorax, with a fringe of rather ragged grey hair on posterior border and a short blunt spine at each hind corner. Abdomen: ground-colour of 1st and 2nd segments and major portion of 3id, 4th, and 5th black, a little shining, the sides of the dorsum, nearly from the shoulders to the extreme tip, and the hind margins of the 3rd, 4th, and 5th, and the bulk of the 6th segment all bright reddish orange with concolorous pubescence. the black parts with sparse black pubescence, a small patch of greyish hairs on hind corners of 2nd segment, and some vellow hairs extend along the narrow red side-edges of the abdomen, nearly or quite to the shoulders. Venter dull reddish orange, becoming brighter towards tip; central part of most of the segments more or less black; pubescence wholly reddish orange. short, depressed. Legs black, with a little short greyish hair; under and inner sides of tibio towards tips and about the apical half of the anterior and the whole of the hind tarsi (the latter lengthened), orange-yellow, with short golden pubescence vellowish grey; stigmatic region black; major portion of middle of wing from anterior to posterior border darker brown, the colour fading away gradually; halteres buff, thoracic squame milkwhite, with concolorous soft hairs.

Length, 17 mm.

Described from a 3, Darjiling, 1000-3000 ft., vi. 1912, and a 2, Singla, Darjiling Dist., 1500 ft., v. 1913, in the Indian Museum.

A very handsome and conspicuous species.

# 35. Odontomyia pulcherrima, sp nov.

Q. Head distinctly broader than thorax; vertex and from fully one-third the width of head, the latter slightly wider towards antenna, with short black hairs, whole head below antenna paler yellow, with soft golden hairs, autennæ black, 3rd joint about 21 times as long as 1st and 2nd together; proboscis black; occiput yellow, blackish in centre; posterior orbits of eyes marrowly yellow, vertical triangle black, small, ocelli pale orange. Thorax with greater part of dorsum down to the suture, except anterior and side-margins, occupied by a large shining black spot, bare except for a broad short stripe of golden pubescence, beginming just behind the anterior margin but reaching only halfway to the suture, on each side behind the suture (just clear of the side-margins) a semicircular black spot (the straight side inwards) and contiguous to the large black spot above the sulure, thus leaving an approximately square space occupying more than half the surface behind the suture, and reaching the posterior border of the dorsum with sharply defined sides, this space is reddish brown, and the large anterior black spot just perceptibly encroaches on the anterior margin of it. Scutellium large, reddish brown, as are the spines and the metanotum, sides of thorax wholly pale yellow with bright golden-yellow pubescence Abdomen moderately shining black, bare, basal half of 1st segment, a large subtriangular spot on each side of 2nd extending from anterior to hind margin, an elongate transverse spot towards each side on hind margins of 3rd and 4th segments (those on latter rather smaller), and a long spot narrowed to a point anteriorly on 5th segment, all light yellow. Venter wholly yellowish. Legs with coxe yellowish or yellowish brown, with yellow hair; front legs black, brown at base of femora, on apical half of outer side of tibie a fan-like row of stiff black hairs, middle legs black, basal half of femora yellowish white, a similarly-coloured band on middle tibia, hind legs black, basal half of femora yellowish white. Pubescence on all legs generally concolorous with groundcolour, some fairly coarse black pubescence at base of middle tibue, tarsı with golden-brown pubescence below, pulvıllı brownish orange, claws orange, black-tipped. Wings pale vellowish brown; costal cell and extreme base of wing, also beyond discal cell, pale grey; sugmatic region blackish brown; veins dark brown. 3rd vein forked very near tip, halteres pale dull yellow.

Length, 10 mm.

Described from a unique Q in the Indian Museum from the Poshoke District, Darjiling, 2000 ft., 26 v.-14 vi. 1916 (Gravely).

# 36 Odontomyia minuta, F.

Odontomyia minuta, Fabricius, Ent. Syst. iv, p. 268 (1794). Odontomyia ochracea, Brunetti, Rec. Ind. Mus. 1, p. 129 (1907) Odontomy:a submutica, Brunetti, loc cit p 130 (1907). Oxycera indica, Brunetti, loc. cit. p 119 (1907) P O pusilla, Fabricius, Ent. Syst iv, p 271 (1794)

3 9. Head with eyes in 3 microscopically pubescent, barely contiguous at nearest approach, and for a very short distance only. gradually separating to vertex, from shining black, with yellowish hairs, ocelli yellowish, frontal triangle with yellowish-grey pubescence, face and underside of head yellowish, with a little whitish pubescence, proboses large, black, antenno with 1st joint distinctly longer than 2nd, orange-yellow, 3rd brownish, 4-annulated, tip black; occiput black. In Q, whole head, including the rather broad postocular orbits, yellow or orangeyellow; a broad shining black band across vertex from eye to eye, sometimes with the appearance of being formed of three large contiguous spots; a pan of large oval shining black spots on froms, placed transversely and slightly diagonally; a pair of similar smaller rounded spots below level of antennæ and just below the Thorax black, with very short golden or grevish largei ones pubescence, sides black, a large pale yellow oblong spot below shoulders, another in front of wing-base, the two spots generally connected above, a third yellow spot below wing-base Scutellum vellow, base black, spines generally extremely small, occasionally Abdomen of of normally yellowish, with a large normal in size rounded or somewhat diamond-shaped spot spread over middle of first two segments; a spot on middle of 3rd segment from anterior to hind margin, narrowed behind, on anterior margin towards sides of 2nd segment, a small spot, a similar larger one on each side of 3rd segment, on 4th and 5th segments a broad band on anterior margin filling about half the surface, the two bands connected by a short median stripe; all the above markings black. In some males the marks are reduced to a dorsal row of small detached rounded or angular spots, in one of the abdomen is wholly yellowish except for a single small black spot on 2nd segment. In 2 a large spot similar to that of the d spread over middle of 1st and 2nd segments, with a small spot towards each side in a line with it; sometimes the three spots more or less united by a short connecting stripe, in one 2 the spots were replaced by a definite uninterrupted broad band; a broad black band on anterior margin of 3rd, 4th, and 5th segments nearly filling the sufraces and sometimes united in the median line by a dorsal stripe. Venter in both sexes mainly yellowish. Legs brownish vellow; femora with a broad median dark brown band; hind tibiæ with a similar band on apical half, generally leaving the tip hale: tips of tarsi barely darker Wings absolutely colourless, anterior veins and stigma very pale yellow; discal cell unusually small. occasionally larger in undividuals, discal cell veinlets almost invisible; halteres yellowish.

Length, 4-5 mm.

Described from several specimens of each sex, including types of

ochracea, submutica, and indica. Siliguii. Rampore, Chaka, United Provinces, 23–31. ii 1907, Ranchi, Bareilly, Calcutta, 21 iii. 1907, 14. vi. 1907, 22. vi. 1907 (Paiva), 23. vii. 1907, 28. ix. 1907 My indica was described from Chapia, Bengal (Mackenzie).

The four prominent black spots on the front of the head, the bands on the legs (though these are sometimes much paler than usual), the very reduced discal cell, and very small scutellar spines all combine to characterize very distinctly this variable species. The form with wholly vellow abdomen, except for a single small black spot at base of 2nd segment, is represented by a 3 in the Indian Museum, and O pusilla, F, is probably identical.

### 37. Odontomyia rubrithorax, Macq.

Odontomyra rubitholax, Macquart, Dipt Exot 1, pt. 1, p 185 (1838), Brunetti, Rec. Ind. Mus 1, p 128 (1907), de Meijere, Tijd v Ent. 1, p 224 (1907) Odontomyra immaculata, Brunetti, loc. cit p 180.

J Q. Head in J black, with short pale hair below, a shining black tubercle immediately below antenna, which are dark reddish brown, tips black, 1st and 2nd joints tawny; eyes large, bare, upper facets much larger than lower ones, contiguous for a short distance, vertical triangle small, black, frontal triangle small, reddish brown In Q, from forming one-third of the head, very slightly broader at level of antenno than at vertex, shining black, Thorax dull black, with very short silvery-white pubescence with short, meagre, golden or biassy pubescence, sides black, with a little white pubescence, scutellim black, gold-du-ted, spines very short. Abdomen pale greenish or yellowish, more or less brownish on apical half, sometimes wholly pale Legs orangeyellow; front femora with a narrow brown ring in middle or a streak on underside; middle femora with a brown streak on underside which is sometimes continued as a ring up the sides, all tips of tarm slightly darker. Wings almost colourless, anterior veins pale yellowish, the rest almost invisible; halteres yellow.

Length, 5 mm.

Described from various Indian specimens. Barelly (Brunetti); Asansol, 13-14 n. 1910; Calcutta, 12. iv 1908, 5 iv. 1907; Port Canning, 24. xi. 1907; Java.

# 38. Odontomyia kashmirensis, sp. nov.

\$\delta\$ . Head of \$\delta\$ with eyes bare, contiguous for only a short space; from widening gradually to vertex, shining black, practically bare, except for a patch of yellowish-grey pubescence at extreme vertex; occlin brown, on a black elevated triangle; occiput black, face black, with considerable yellowish-grey pubescence, the median space slightly prominent, more or less shining black, sometimes dark brown, with less pubescence; mouth-region and palpi yellowish, proboscis black; antennæ orange, 3rd joint \$\text{F}\$ 2

with four annulations, a little more brownish with blackish tip. From in 2 as in O dorsoangulata, inicroscopically punctate, except for a rather wide postocular orange margin which bears very short, almost tomentose, yellow pubescence. Thorax black, with rather dense, moderately long, yellowish-grey pubescence, which extends below shoulders and over upper part of sides, lower part of sides with white pubescence Scutellum bright orange-vellow or greenish vellow, with vellowish pubescence, base narrowly black; spines yellow. Abdomen yellowish or brownish vellow; an uninterrupted moderately broad median dorsal black stripe composed of an elongate spot on middle of 1st segment and a large squarish spot (narrowed towards hind margin) on both 2nd and 3rd segments, a similar rather broader spot on 4th segment rounded behind and encroaching on 5th segment. In the 2 the dorsal stripe slightly broader Venter brownish yellow, more or less darker towards tip Legs orange, with very short whitish pubescence; coxe a little brownish, front pair blackish, with white pubescence, tarsi a little darker. Wings quite colourless; anterior veins and stigma pale vellowish; halteres vellowish, sometimes apple-green.

Length, 8-10 mm.

Described from a few specimens of both sexes in the Indian Museum (including types) from Kashmir, 1915 (H. I. Pease); one 2 from the Jhelum Valley, Kashmir, 5200 ft., vii—ix. 1915 (Pease).

This is very like O solemns, Wlk, especially in the J, but the difference in the Q Q proves them to be quite distinct species, as O hashmirensis has broad postocular orbits and in O. solemns these are practically absent. The J O. kashmirensis has the facial prominence normally black; in O. solemns it is brownish orange and more conspicuous

## 39. Odontomyia dorsoangulata, sp. nov.

of Q. Head of S with eyes bare, contiguous for half the distance from vertex to frontal triangle, vertical triangle narrow, black, with a few short yellow hairs; occili distinct yellow or brown; frontal triangle and face orange, with a little whitish pubescence; lower part of head pale yellow, with short white pubescence; proboscis blackish; palpi pale yellow; autennæ orange, 3rd joint a little more brownish, with four annulations and a rather long narrow pointed style; occiput blackish, considerably concave. Frons in Q at middle one-third width of head, very slightly narrower at vertex, orange, face and lower part of head orange-yellow; frons a little more bright yellowish brown; postocular orbits inappreciable. Thoraw black, dorsum with very short close golden yellow or brassy pubescence, which, except towards the sides and shoulders, becomes almost tomentose; sides of thorax mainly black about the centre, with short whitish

pubescence, pale yellowish pubescence on prothorax, and short golden-yellow pubescence broadly just below dorsum and around base of wings, metathorax with a tuft of dirty grey pubescence Scutellum bright apple-green or yellowish, narrowly black at base, bare, except for a small white fringe on hind margin, spines pale yellow. Abdomen in o pale yellowish, varying from greenish yellow to brownish, 1st segment with an elongate transverso black spot on middle of hind margin; 2nd, 3rd, and 4th each with a large black spot in the centre reaching from anterior to hind margin, broader in front; 5th with a more or less similar spot not reaching hind margin, all the spots contiguous, forming an angular black median stripe. In one of the two Q Q before me the spots are as in the d, in the other they are much enlarged, leaving only a moderately broad pale side-margin. Venter vellowish or brownish yellow, sometimes a little marked with brown or with a very narrow median line Leas orange, tips of tarsi barely brownish. Wings clear, the stronger veins pale vellow: halteres brownish vellow or apple-green

Length, 8-11 mm.

Described from four 3 3 and two \$\frac{2}{3}\$ in the Pusa collection, and a number of both sexes in the Indian Museum Pusa, 10. viii. 1915, Chapra, Bengal, Calcutta, iii, iv, ix, x., xii, common on chrysauthemums, Poit Canning, 24 vii. 1907, on Euphoibia; Combatore, Madras, "bred from aquatic larva," 7. & 10. x 1913; Bangalore (Cameron)

Types in Indian Museum, from Calcutta, 18 in. 1907 (d) and

23 iv. 1907 (♀).

Larva of at least 12 segments, with perhaps an additional one, too retracted to be visible, following the narrow 1st (head) segment, dark nut-brown, with darker marks; venter rather flattened, yellowish, with a few short hooks on hind margin of the last five segments, apart from the ultimate segment which bears a tuft of whitish curling breathing-tubes. Length, 21 mm., exclusive of breathing-tubes.

Three previously-described species must be very near the above, and though none of the descriptions quite apply, it may possibly

prove identical with one of them.

## 40. Odontomyia solennis, Walk.

Odontomym solenns, Walker, Ins. Saund, Dipt. 1, p 79 (1856).

3 2. Head with eyes of 3 bare, practically contiguous for only a short distance, from widening very gradually to vertex, which is black, with very short yellow hairs and reddish-brown well-separated ocelli; frontal triangle very small, black, with silvery-white pubescence; tace and underside of head (except broadly around mouth) black, with pubescence that appears dark, viewed from above, and silvery white viewed from below, lower orbits of eyes with white pubescence; mouth-opening broadly

pale yellow, proboscis black; facial tubercle reddish brown, moderately prominent, more or less bare, shining; antennæ orange, 3rd joint more brownish, tip blackish, occiput black Q, from one-third of head, approximately of uniform width throughout, shining black, with short golden pubescence about antennæ, face similar, with white pubescence, a pair of large bare shining orange-brown or dark brown contiguous spots immediately above and contiguous to antennal prominence, rest as in J. Thorax black, with short golden-yellow, greyish, or whitish pubescence, which is almost tomentose in centre of dorsum and longer towards sides, sides of thorax black, with rather longer though still comparatively short pubescence, occasionally just below dorsum the pubescence is concolorous with pubescence of that region, scutellum narrowly margined with orange, spines Abdomen yellowish to brownish, 1st segment brownish orange with a small elongate spot on middle of hind margin, of variable width, 2nd and 3rd segment with a large median spot on each from anterior to hind margin, narrowed in middle, 4th with a large spot, generally broader than the others, placed on anterior margin, rounded behind, not reaching hind margin; all the spots contiguous to one another, forming a more or less angulated dorsal stripe Considerable variation occurs in the width of the spots on the 2nd and 3rd segments, which are often very narrow or obsolete, in some specimens (one Q from Chapra, Bengal) the abdomen is brownish, bearing only an indistinct narrow blackish stripe on 3rd and 4th segments; in some specimens the abdomen is brownish, with indistrict and irregular blackish marks over the whole centre. Venter brownish or vellowish, with more or less darker marks. Legs yellow, tips of tarsi from barely darker to distinctly brown; occasionally a shining brown streak, varying in size, on middle of outer side of hind tibix (in one specimen from Chapra, Bengal, extending to more than the middle half of the tibiæ; in this example tips of tarsi dark brown, hind tarsi dark brown, last three joints black). Wings quite colourless; anterior veins pale yellow; halteres vellowish.

Length, 7-10 mm.

Described from a number of both sexes in the Pusa collection, taken at Pusa, 29. 11.-28 v in various years on Justicia, indigo, and sugar-cane. Also occurs at Chapra, Bengal; a & in the Indian Museum from Balugaon, Puri District, Orissa, 21-30. vii. 1913 (Annandale), and a \$\rmathcap\$ taken by me at Barelly.

# 41. Odontomyia lutatius, Walk.

Stratiomys lutatius, Walker, List Dipt. Brit. Mus ii, p 532 (1849). Odontomyra lutatius, Brunetti, Rec. Ind. Mus i, p. 129 (1907).

Q. Head distinctly broader than thorax; eves bare; froms rather more than one-third of head, sides parallel, upper half black, moderately shining, with short golden pubescence; ocelli

brownish yellow, ocellar triangle barely elevated, lower half of from with a median impressed line, shining, brownish yellow, face and lower part of head more yellowish, with short goldenyellow pubescence, occiput black, postocular orbits moderately broad with close golden tomentose pubescence Antenno orange, 2nd joint slightly longer than 1st, 3rd reddish brown, 4-annulated, last one slightly darker; the two-jointed style orange-Thorax black, with very short dense golden almost tomentose pubescence, sides black, pale yellowish for an indefinite space below wings, wholly covered with very short golden pubescence. Abdomen above and below wholly orange-yellow, microscopically pubescent, a faint median impressed line. Legs all orange, with minute pale pubescence, tips of tarsi brown. Wings colourless, 3rd veinlet from discal cell absent, yeins and stigma very pale yellow, halteres orange.

Length, 10 mm.

Redescribed from a 2 from Chapra, Bengal, and one from Siliguri, foot of Darpling Hills

## 42. Odontomyia transversa, sp. nov

2. Head with from fully one-third of head, sides parallel, orange, nearly base; vertex small, black, ocelli yellowish; a pair of rather large diagonally placed brownish spots on each side of upper part of from with indistinct outlines (possibly sometimes forming a median brown spot of irregular shape and size), face and lower part of head and postocular orbit bright yellow, bare, except for a few scattered short yellow hairs; antennæ orange, 1st and 2nd joints subequal Thorax with dorsum black, with almost tomentose golden pubescence; margins of dorsum, except the anterior one, broadly yellow, sides mainly yellowish; lower part of sternopleura black, a large brown spot on mesopleura, a similar smaller brown spot in front of wing-base wholly chrome-yellow, very narrowly black at base; spines very small, yellow Abdomen yellow, anterior margins of 2nd, 3rd, and 4th segments each with a broad chestnut-brown band extending nearly to the hind margin; a darker, nearly black spot at sides of 2nd, 3rd, and 4th segments contiguous to anterior margin, diffused hindwards into the brown colour; 5th segment mainly dark brown, a small dark brown spot towards each side of 1st segment; venter yellowish. Legs orange to tips. Wings pale yellowish grey; anterior veins and stigma vellowish; halteres orange-yellow.

Length, 9 mm.

Described from a single 2 from the Pusa collection taken at Palur, Madras, viii. 1915; sent to the British Museum.

It is just possible that this may be viridana, Wied., though his description of the abdomen does not correctly apply; yet species in Odontomyia are often so variable that the two may be identical.

### 43. Odontomyia viridana, Wieil.

Odontomyia viridanii, Wiedemann, Analec. Entom p 29 (1824)

"Antennæ and legs reddish yellow, epistome and lower part of frons green, rest of frons ochraceous; thorax black, apex, sides and two stripes clothed with rather golden hairs, posterior corners and sides of thorax green, latter with two reddish-yellow spots, scutellum black in middle at base, abdomen black, with somewhat reddish-yellow segmental margins; at each side of each segment a green transverse spot, which sometimes extends across the whole segment, venter green, wings quite clear, veins pale reddish yellow; halteres yellowish, clubs green; all the green colour emerald-green. Bengal. Westermann's collection."

## Subfamily SARGINÆ

Head semicircular, attached by a thin, rather long, very fragile neck; eyes large, bare or hairy, generally contiguous in o; antennæ with 3rd joint not elongate, rounded or rather flattened, always with a distinct arista Thorax roughly oblong, scutellum generally unspined Abdomen 5- or 6-segmented, generally distinctly longer than thorax, in most genera with approximately parallel sides, generally of brilliant metallic-green, blue, violet, or brassy shades, sometimes short and rounded (Microchrysa) Leys weak and simple. Wings with costa nearly reaching wing-tip; 3rd vein generally forked, both branches ending before wing-tip, anterior cross-vein joining præfurca instead of 2nd vein with discal cell-an exceptional character; posterior cross-vein present, so that the 5th vem forms no part of the discal cell; 4th vem with three terminations, which do not reach the wing-margin; 5 posterior cells, all open, anal cell closed near border of wing; squame small.

The only character distinguishing this subfamily from the others is that of the anterior cross-vein joining the profure and discal cell, instead of the 3rd vein and discal cell as is usual. The more or less rounded 3rd antennal joint with distinct arista, the parallel-sided elongate abdomen, and the brilliant metallic colour of most of the species are other characters mainly applying to this subfamily. The species are thinly pubescent or nearly bare.

Life-history. That of several European species is partly known, but the exact identity of some of them is doubtful, the accounts of them having been written before the species were clearly distinguished. Larva with sides nearly parallel, not tapering behind; each segment with about six rather long bristles transversely placed on both upper and lower surfaces. Lundbeck thinks the metathoracic spiracles may be absent. The larva occur in dung and garden mould. The perfect insects are generally distributed and fly with rapidity in hot sunshine.

### Table of Genera.

1 Third vein unforked
2 Third vein forked
Second antennal joint with a thumb-like
expansion over the 3rd on inner side
Second antennal joint without any such
expansion

3 Eyes densely pubescent in both sexes Eyes bare or practically so .

4 Third antennal joint with six annulations Third antennal joint with four annulations

5 Abdomen elongate, eyes in 3 not quite contiguous, discal cell veinlets distinct Abdomen short, rounded, eyes in 3 contiguous, discal cell veinlets very faint

Prosopochrysa, Meij, 2 [p 80

PTLCTICUS, Lw., p 73.

3 [p 84 Chloromyia, Dunc., 4 [p Sõ. Brachycara, Thoms,

SARGUS, F., p. 81
[p 87.
MICROCHRYSA, LW,

## Genus PTECTICUS, Lw.

Ptecticus, Loew, Verh zool.-bot Ges Wien, v, p 142 (1855), Brunetti, Rec Ind Mus i, p 108 (1907) Plecticus, Loew, loc cit v, p 147 (1855)

GENOTYPE, Sargus testuceus, F.; by original designation.

Mainly of the normal Sargid type, but technically non-metallic large yellowish flies, with darker markings and often yellow wings. The 2nd antennal joint distinctly overlapping 3rd on inner side

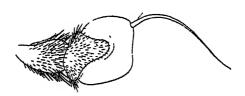


Fig. 4 -Ptectious, antenna, innoi side

by a thumb-like extension; \* 3rd joint short and broad, arista very thin; head rounded, eyes in sapproximate only and for only a short distance; frontal triangle inflated. Thorax and abdomen as in Sargus, but perhaps less pubescent, genitalia in sarther large and tree. Wings long, anterior cross-vein exactly at tip of prafurca; † posterior cross-vein occasionally absent or abortive (australis).

Range. Central and South Asia, Japan, Orient, South Africa, Madagascar, North, Central, and South America.

\* With rare exceptions, according to Williston. It is very pronounced in all the Indian species.

† In all Indian species except cyanous. This character is not necessarily generic.

## Table of Species

1 Body geneous or metallic Body never metallic, yellowish, with darker markings, anterior cross-veins at tip of præfurca . 2 Anterior cross-vein at tip of preferca; body [p. 75. reneous blue, green, or black, femora orange, longipennis, Wied, wings exceptionally long Anterior cross-vein much before tip of priefunca, body shining violet (2), femora black, wings of normal length cyaneus, Brun , p. 75. aur obrumens, sp. n., 3 Wings wholly dark brown Wings never wholly dark brown, either p 76. yellowish on basal and blackish on apical half or practically unitorm yellowish grey 4 Wings yellowish on about basal half, blackish 5 on remainder Wings uniformly yellowish or yellowish grey (or practically so) 5. Genitalia black, tarsı always more or less dark, wings yellow only up to just beyond в. discal cell ... Genitalia fulvous, tarsi orange to tips, wings yellow nearly up to halfway between discal cell and wing-tip wulpu, Bran., p. 77 6 First four abdominal segments orange, with or without darker transverse spots or bands, [p 78. these segments generally similarly marked, aurifer, Walk, rest of abdomen black.. First four abdominal segments orange, 4th with a large round black spot, conspicuously different from the other segments aprealis, Lw., p. 77. 7 Front metatarsus nearly as long as tibia; whole front tarsus proportionately much longer than in ceylonicus, and brown from tip of 1st joint to tip of tarsus; hind tarsus all white except extreme base of metatarsus, 1st abdominal segment with blackish hand, posterior cross-[p. 79. vein practically absent, long. 10-12 mm. australis, Sch. Front metatarsus much shorter than tibia, whole front tarsus proportionately much shorter than in australia, and only last three joints brown, hind metatarsus all black, 2nd joint and part of 3rd yellowish white or white, rest dark brown or black; 1st abdominal segment without cross-band, but sometimes a little darker in middle; posterior cross-vein distinctly present; long. 14-18 mm. ... ... oingulatus, I.w,

[var ceylonicus, nov., p. 80.

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### 44 Ptecticus longipennis, Wied.

Surgus longipenius, Wiedemann, Analec Entom p 31 (1824), id, Auss Zweifl 11, p 34 (1830), Macquart, Dipt Exot Supp 5, p. 67, pl 1, fig 11 (1855)

Ptecticus longipenius, de Meijere, Tijd v Ent liv, p 265 (1911)

d. Head with eyes not absolutely contiguous at any point, but nearly so immediately above the bright lemon-yellow, very inflated frontal triangle, which bears a few yellow hairs, the shining black from widening gradually to vertex, which bears a few brown hairs, face bright yellow, mouth-opening, proboscis, and neck orange, antenne yellowish, lower part of head with pale hairs. shiming metallic dark blue, or brassy, pubescence pale yellow, a rather broad orange-vellow callus-like stripe from the yellow shoulder to wing-base, hind corners of dorsum orange; prothorax orange, sternopleura shining yellow, rest of sides of thorax meeous brown or blackish, with short pale hairs, scutellum metallic blue, hind margin narrowly orange, metanotum metallic blue Abdomen metallic black, 1st segment reddish yellow at extreme base, 2nd to 4th segments with reddish-yellow bands on hind borders, sometimes extending over the bases of the next segments. Legs orangeyellow; hind tibiæ wholly black, hind tarsi all yellowish. Wings exceptionally long, very pale vellowish, anterior cross-vein exactly at tip of præfurca, posterior cross-vein absent, 5th vein in punctiform contact with discal cell, 2nd and 3rd veinlets from discal cell parallel, 3rd a little foreshortened, a brown cloud on apical part of wing extending inwards halfway to discal cell; halteres yellow, clubs brown.

Length, 12 mm

The above description is from a  $\sigma$  (without abdomen) in the Indian Museum from Sadiya, Assam, Bigot's description being also incorporated. Recorded by de Meijere from N E Sumatra.

The 2nd antennal joint has the peculiar shape characteristic of Ptecticus, so the species must be removed here from Sargus, as noted by de Meijere  $(l \ c)$ .

## 45. Ptecticus cyaneus, Brun.

Placticus cyaneus, Brunetti, Rec Ind. Mus vii, p. 453 (1912)

Q. Head with from almost linear, brilliantly shining violet and blue, with short soft black hairs, occili placed much below the vertex, small, pale yellowish brown, occiliar triangle very slightly elevated; the slight protuberance above the antennæ pale whitish yellow, face blackish, with black hairs, lower part of head reddish brown, prominent; back of head black, with a fringe of white bairs. Antennæ with 1st and 2nd joints black, shining, 3rd joint and the overlapping inner side of the 2nd joint coffee-brown; arista black, apical. Thorax dorsally and scutellium brilliantly shining violet, with rather copious brownish-grey hairs, thorax below

dorsum brilliantly shining peacock-green, with short whitish hairs, a small brownish-yellow spot on the shoulders is connected with the wings by a very narrow brownish-yellow ridge delimiting the dorsal and ventral surfaces. Abdomen brilliant shining violet, with pale grey hairs, venter similar. Legs femora black, with short white hairs, a little brownish yellow at base; the knees of similar colour and the coxe with a mark or two of the same shade, tibbe black, more or less yellowish on apical part, the whole surface with short pale yellow hairs; tarsi dark, with pale hairs, underside of hind tarsi with short, very dark golden-brown pubescence. Wings grey; stigma ill-defined; this region of the wing brownish, yeins dark brown; halteres yellowish.

Length, 14 mm

Described from one Q in the Indian Museum from Ukhrul, Manipur, Assam, 6400 ft. (Rev. W. Pettigreiv)

### 46. Ptecticus aurobrunneus, sp nov.

3 Head with vertex and from down to its narrowest part deep orange, former with golden and brown hans intermixed, latter with golden hairs only; frontal triangle bright lemon-yellow, nearly bare, ocellar triangle black, ocelli with a reddish tinge; face, mouth, and proboses orange-yellow, antennæ orange, arista black, orange at base; eyes black, occiput yellowish, reduced, owing to the margins of the eyes themselves curving backwards Thorax dorsally and scutellum dark chestnutconsiderably brown, with just a suggestion of three darker stripes, wholly covered with short, dense, though inconspicuous, golden pubescence, propleura, pteropleura, metapleura, and metanotum lighter chestnut-brown, mesopleura and sternopleura shining blackish, whole sides of thorax, even to the mesopleura, with short dense golden pubescence, though at first sight they appear to be bare. Abdomen with 2nd to 5th segments dark chestnutbrown, with short dense golden pubescence, which is invisible when viewed from in front, but from that view a large irregularly shaped black spot is seen in the centre of each segment, almost forming a dorsal stripe, 1st segment and tip of abdomen black, with some yellow or golden hairs, genitalia and vertex dark brown, the latter with microscopic golden pubescence, only visible when viewed from in front Legs with front coxe brownish orange; posterior coxe dark brown, all with a little golden hair; rest of legs bright orange; posterior femora black on basal half; tips of tarsi a little darker Wings rather dark brown, a small space in both basal and discal cells slightly paler, and traces of similar lighter spaces in the centres of some of the other cells: halteres pale yellowish.

Length, 21 mm.

Described from a unique of in the Indian Museum from Parambikulam, Cochin State, 1700-3200 ft, 16-24. ix. 1914 (Gravely).

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#### 47 Ptecticus wulpii, Brun.

Ptecticus voulpu, Brunetti, Rec. Ind. Mus. 1, p. 111 (1907), id, op. cit. 1x, p. 263 (1913).

Ptecticus apicalis, Wulp (nec. Loew), Notes Leyd. Mus. vii, p. 62 (1885)

3 ♀ Differing from P am ifer, Walk., as follows -

Abdomen normally all orange to tip, 1st segment a little darker, and often, if viewed from behind, a large blackish spot is seen in the middle of each segment, sometimes diamond-shaped, sometimes irregular in shape, covering nearly all the surface of each segment, genitalia brownish orange, this latter being the best specific difference of all. Another difference, which seems equally constant, is in the legs, which are all orange to the extreme tips except for the moderately dark brown posterior coxe and basal halt of the posterior femora. The black apical part of the wing is of much less extent, not beginning till some distance beyond the discal cell; some specimens have the wing darkened from the tip only up to midway between the discal cell and the wing-tip

Same size as awifer.

Described from two of of in the Indian Museum, one of one Q in the Pusa collection: Darpling District, 1000-3000 ft., v. 1912; Singla, iv 1913, Nilgiri Hills, 3500 ft (Andiewes), 7000 ft, v. 1904 (Rowson), Parambikulam, Cochin State, 1700-3200 ft, 16-24.ix. 1914 (Gravely).

Unless P aurifer, Walk., should prove to have fulvous genitalia, P. wilpii is easily separated from all the other species in this group by that character alone. It presents an extraordinary resemblance to the Tipulid, Pselliophora compeditu, Wied, and both have been seen by me from the same locality.

## 48 Ptecticus apicalis, Lw.

Ptecticus apicalis, Loew, Verh. zool.-bot. Ges. Wien, v, p. 142, pl., figs 3, 4 (1855), Brunetti, Rec Ind. Mus 1, p 110 (1907). Saryus lundus, Walker, Proc Linn Soc Lond 1, p 8 (1856).

Brownish red-yellow, shining; 4th abdominal segment with a very large black spot, the next wholly dull black, the rest deep black, rather shining; venter much as upper side of abdomen. Frons very narrow, reddish yellow, lower part whitish yellow; occili placed on a blackish cross-band; frontal triangle whitish yellow, puffed up. Antennæ light reddish yellow, 3rd joint barely visibly annulated, tip truncate. Legs concolorous with body; hind tibiæ always darker towards tip; front and middle tarsi with last two joints darker, also hind metatarsus. Wings large, reddish yellow up to beyond discal cell, becoming grey towards hind margin; a large blackish-brown spot filling more than apical third of wing.

Length, 15 mm
Described from Pulo Penang, in Westermann's collection,
Vienna Museum.

#### 49 Ptecticus aurifer, Walk.

Sargus aurifer, Walker, List Dipt Biit Mus. v, p. 96 (1854). Ptecticus aurifer, Biunetti, Rec Ind. Mus. 1, p. 110 (1907).

3 9 Head with eyes in 3 with their point of nearest approach distinctly below haltway between vertex and base of antenna, the space between them perhaps 1 to 1 of a millimetre; thence upwards from widening gradually till at vertex it is almost 1 millimetre broad; bright orange with orange pubescence; frontal triangle elevated, shining, smooth, lemon-yellow, bare, except for a small tutt of orange hairs just above base of antenno; tace very small, yellowish, as are the very narrow inner lower eye-margins near the very large mouth-opening, occiput black, upper margin with yellow pubescence, ocelli yellow on a black ocellar triangle; proboscis and the very large labella orange-yellow, with a few hairs. Antenna orange, tip of upper side with a black mark, arista black, orange at base. From in Q at narrowest part distinctly broader than in d, so that it is only about two and a half times broader at vertex than at frontal triangle. Thorax: sides, scutellum, and metanotum bright orange, all with a little very short yellow or orange pubescence, which is a little longer on the sternopleura, metapleura, and metanotum; dorsum sometimes with a little more brown in it and sometimes, especially in the 2. traces of three longitudinal brownish stripes can be seen domen normally with first four segments bright orange, remainder (including genitalia) black, but the orange segments often have more or less brown in them, sometimes in the form of large transverse spots occupying nearly all the segments, sometimes the whole dorsum is uniformly more brownish, the first four segments with very short inconspicuous golden-yellow pubescence, the rest with almost microscopic greyish pubescence Venter mainly orange on first four segments, remainder black, but 4th, and sometimes 3rd also, often bear large blackish patches. Legs all orange, with short yellow pubescence, last two joints of anterior tarsi brown, about apical half of hind tibiæ brown; bind tarsi blackish brown, especially first two joints, underside with rich golden-brown pubescence Wings with basal half up to just beyond discal cell bright orange-yellow, remainder moderately dark brown; veins a little deeper orange, veinlets from discal cell dark brown, 3rd only moderately sinuous; halteres orange

Length, 12-20 mm.

Described from a series in the Indian Museum, Sarawak Museum, and Pusa collections. Mussoorie, 6500 ft. (Bond); Darjiling, 1000-3000 ft., v-v1. 1912; Peshoke Spur, Darjiling

Distr., 4000 ft., v-vi 1916, Lebong, Daijihing Distr., 4500 ft, 2-9. v. 1909 (Howlett), Singla, Darpling Distr., 1500 ft, iv. 1913; Siliguri, base of Darjiling Hills, 18-20 vii 1907, Sikkim, Margherita, Assam; Nongpoh, Khasi Hills, Assam, 1000-3000 ft, vi. 1905, also from Matang, Trusan, Klinhang, and Kuching (all Borneo).

This is the commonest Indian species, apparently.

## 50. Ptecticus australis, Sch.

Ptecticus australis, Schiner, Novara Reis, Dipt. p 65 (1868), Brunetti, Rec Ind Mus. 1, p 113 (1907)

3 9. Head eyes in 3 with upper facets very little larger than lower ones, no clear dividing-line, barely contiguous at point of nearest approach, and for a very short distance only; froms widening gradually to vertex, shining black, with a few brown hairs; ocelli rather close together, ocellar triangle small, only slightly elevated, frontal triangle elongate, whitish yellow, bure (in one specimen a pair of dark oval spots in the middle placed longitudinally side by side), face, proboscis, and palpi orangevellow, labella very large, antenno orange, arista black; occuput dark, very concave. In Q, trons comparatively nairow, dull brownish orange or blackish, shining. Thorax, scutellum, and metanotum wholly orange, with very short concolorous pubescence Abdomen orange, normally with a transverse deep blue or violet band just behind anterior margin of first four segments, the bands sometimes not reaching the side-margins, 5th segment mainly blue-black, except anterior margin, the bands vary considerably m width, but generally have parallel edges; in one 2 the bands are replaced by a pair of elongate transverse spots on each segment; occasionally the last two or three segments are almost wholly violet or blackish, genitalia in of prominent, rather large. concolorous, in Q very small; venter brownish yellow Legs orange-yellow, hind tibis all black, hind tarsi wholly white, anterior tarsi with brownish tips. Wings pale yellowish grey; 1st veinlet from discal cell considerably bent downwards at or just before middle, 2nd nearly straight; 3rd foreshortened. near and parallel with 2nd; posterior cross-vein absent, so that upper part of 5th vein is in punctiform contact with lower corner of discal cell; halteres orange, knobs blackish.

Length, 10-12 mm.

Described from several of each sex in the Indian Museum, Pusa and other collections Kurseong, Darpling Distr., 5000 ft., 4. vii. 1908 (Annandale); Soom, Darpling Distr., 4000-5000 ft., 16 vi. 1914 (Gravely); Kalimpong, Darpling Distr., 600-4500 ft., 24. iv.-10 v 1915 (Gravely); Sukna, N Bengal, 500 ft., 1. vii. 1908 (Annandale); Rungpo, Sikkim, 1400 ft., 6. ix. 1909; various localities in Bengal, vii., ix.; Pinjore, Patiala State, 17. vii. 1911; Calcutta, 23. vii. 1907 (Annandale); Pollibetta, Coorg, S. India,

15-25 v 1914 (Fletcher), Coonoor, Nilgiri Hills, S. India, vi 1912 (Capt Sewell), Peradeniya, Ceylon, 26 vii. 1910; Margherita, Sadiya, Assam; Tura, Garo Hills, Assam, 1917 (Kemp).

### 51. Ptecticus cingulatus, Lw., var. ceylonicus, nov.

Ptectrous congulatus, Loew, Venh. zool-bot Ges Wien, v, p. 143 (1855)

Alhed to P aurifer, Walk, except in the wings and genitalia.

3 9 Head from shining black, with black pubescence, from vertex to point of nearest approach of eyes where they are almost actually contiguous; frontal triangle lemon-yellow or orangeyellow; rest of head as in aurifer. Thomax as in aurifer, traces of three faint longitudinal dorsal stripes in some specimens Abdomen orange, with a transverse oval black spot on each segment from the 2nd to the 5th, placed just behind fore border and quite clear of side and hind margins, the spots larger in the Q, practically placed on anterior margins, also reaching side-margins on 2nd segment. Genitalia quite differently constructed from those of aurifer and wulpin, much narrower, composed of a pair of twojointed claspers and a large curved dorsal plate ending in a narrow style and two lamelle, the organs placed sideways, genitalia in 2 small, concealed. Legs orange, a brownish streak on outer side of hind femora which curves round to the upper side towards tip, where it dies away; it is not at all conspicuous and is easily overlooked, yet it seems one of the principal characters of the species: hind tibiæ and hind metatarsi black; 2nd and 3rd joints of latter whitish, remaining joints blackish; anterior legs all orange, except the tips of the tarsi, which me a little browner. Wings uniformly pale yellowish grey; 3rd veinlet from discal cell more strongly bisinuate than in aurifer.

Length, 14-18 mm.

Described from 6 & and 1 \( \text{ in the Indian Museum from Kandy, v-vii. 1910} \); Santi Koppa, N Coorg, S. India, 4-9. v. 1914.

From the peculiar white 2nd and 3rd hind tarsal joints and the curved streak on the hind femora I am compelled to regard this form as cingulatus, Loew, as these characters do not appear in any other species. From his description, however, I originally assumed the wing to be half yellow and half black, as in the curifer group; but it may perhaps be understood to mean yellowish brown at the base and in front, and the remainder more of a smutty brownish colour, although this does not properly agree with the wings in the above-described form. I have seen four specimens in the Sarawak Museum collection from Borneo that agree still more (apart from the same doubt as regards the wings) with Loew's description, as the black abdominal bands are of uniform width and actually reach the side-margins in all cases.

sargus. 31

### Genus SARGUS, F

Sarqus, Fabricius, Ent. Syst. Supp. pp. 549, 566 (1798), Brunetti, Rec. Ind. Mus. 1, p. 104 (1907).

GENOTYPE, Musca cupraru, L.; by designation of Latreille Consid. Gón. (1810)

Head hemispherical, attached to thorax by a slender neck, as wide as broadest part of thorax, face slightly projecting, pubescent; ocelli placed well forward on vertex in a short isosceles triangle, equidistant in some species, eyes bare, separated in d by a narrow frons, wider apart in 2, upper facets in d scarcely larger than lower ones. Antenno short, in profile placed below middle of head; first two joints bristly, short, subequal. 3rd joint shortly conical or roughly rounded, with four annulations, arista subapical, long, bare, except at base. Thorax with anterior part obling, widened towards base of wings, posterior part of dorsum rounded; scutellum unarmed, usually concolorous with the metallic-green dorsum and bearing the same short pubescence Abdomen much longer than thorax, with parallel sides or broader posteriorly, brilliantly shining metallic, the of usually green or golden brassy, the Q more often blue or violet, moderately pubescent; genitalia small. Legs simple, rather long and thin, metatarsi long Wings generally longer than abdomen, over which they fold when at rest, of the usual Stratiomyid type, costal vein nearly reaching wing-tip; anterior cross-vein connecting the profurca (instead of the 3rd vein) with the discal cell, thus creating the appearance of the 3rd vein being twice forked; 4th vein with three terminations, barely or not reaching wing-margin; posterior cross-vein distinct. squame of moderate size, thoracic pair elongate, very prominent.

Range World-wide

Life-history. That of several European species is known, the

larvæ hving in garden-mould, cow-dung, and in the elm.

Some attempt has been made to supplant the name Saryus on the ground of its being preoccupied, but the name is too old to be changed now. Verrall also disputes the validity of the alleged preoccupation.

# Tuble of Species.

- 1. Wings dark brown; length 14-18 mm. .... yenmifer, Walk Wings yellowish .... 2.

# 52. Sargus gemmifer, Walk.

Surgus gemmifer, Walker, List Dipt Brit. Mus. iii, p. 516 (1849). Sargus magnificus, Bigot, Ann. Soc Ent. France, (5) ix, p 222 (1879); Brunetti, Rec Ind. Mus. i, p. 106 (1907)

3 ♀. Head with from, though very narrow, parallel-sided for

a considerable distance, widening gradually to vertical and frontal triangles, with black haus throughout its length, upper part blue or violet, merging into green at its narrowest part, and thence to yellow on frontal triangle, antennæ brownish orange, tace brownish, with moderately dense yellow pubescence; proboscis brownish orange, occiput dark with marginal fringe of pale hairs. In Q, from no wider than in J Thorax in J brilliantly shining metallic green, with rather dense short yellow pubescence, scutellum similar, front and hind corners of dorsum, and a stripe from shoulder to wing-base, brownish yellow; sides of thorax almost wholly metallic green, with yellow pubescence and violet In 2, thorax deep blue, with soft white pubescence. Abdomen in o brilliantly shining metallic cupreous green, with dense deep orange pubescence, which is rather thicker towards sides, venter darker or with violet tinge, shining, with pale vellow microscopic pubescence. In 2, brilliant violet with a bronze tinge and white pubescence. Genitalia in 3 consisting of a pair of orange-brown claspers and two upper short dark harry cylindrical lamella. Legs in o brownish orange, posterior coxe shining blackish, hind femora broadly at tips and hind tibue broadly at base, blackish; tarsi blackish on upper side, especially hind pair, all legs with minute pale pubescence. In Q, legs all black, except brownsh knees and underside of front tibia; tarsi with brown pubescence below Wings distinctly brown, a little darker anteriorly, venation normal; halteres yellowish

Length, 17-18 mm.

Described from four of of in the Indian Museum: Mergui, Tenasserim (Doherty); Pyinmana, Burma, vi. 1910 (II L. Andrewes); Sylhet; and one Q from Tura, Garo Hills, Assum, 1500 ft, vii. 1917 (Kemp).

Easily known from all other Indian species by its great size and splendour. The Indian Museum specimens from Temasserim were named by Bigot as his magnificus, but I now feel sure they are synonymous with Walker's genumfer, and possibly pubescens, Wulp, may be another synonym.

# 53. Sargus metallinus, F. (Pl. I, figs. 22, 23)

Sargus metallinus, Fabricius, Syst Antl p 258 (1805), Brunetti, Rec Ind. Mus 1, p. 100 (1907), Wiedemann, Auss Zweifl ii, p. 30 (1830), de Meijere, Tijd. v Ent hv, p. 265 (1911)
Sargus formicæformis, Doleschall, Nat. Fijd Ned. Ind Aiv, p 403, pl. 11i, fig 5 (1857)
Sargus pallipes, Bigot, Ann Soc. Ent. France, (5) 1x, p. 222 (1879).

3 \( \text{\$Q\$}\). Head: from in \$\text{\$d\$}\ extremely narrow, with sparse greyish pubescence; slightly wider towards vertex and distinctly broadening towards antennæ; the upper narrower part varying from bronze to bright metallic green, the lower part brownish yellow or brownish; vertex with some brownish yellow hairs. In the \$\text{\$Q\$}\,, from at its middle one-seventh width of head, distinctly

sargus. 83

though not greatly wider towards vertex and antennæ, varying from brilliant metallic violet-blue to bright green, bearing moderately dense grey pubescence on upper part, and more brownish about the middle, above the antennæ the frons takes the form of a large, bare, shining, pale yellow (sometimes brownish) callus Face and lower part of head, including probosers, varying from brownish orange to pale yellowish, with light yellowish pu-bescence, occuput black; postocular fringe whitish, continuous. Thorax with dorsum and scutellum brilliantly shining metallic green, bronze-green, or cupreous in J, and bluish green or green in Q, with dense fine yellow (3) or whitish (Q) pubescence; pleure concolorous, with shorter pubescence. Abdomen metallic shining yellowish bronze or cupreous in  $\delta$ , violet or blue in Q, with dense though not conspicuous yellow pubescence towards sides in d, the dorsal region often nearly bare; whole surface in 2 with short white pubescence, a little longer towards sides, venter generally dark brown or æneous, shining, with microscopic pubescence. Legs pale yellow, with very short pale yellow (3) or white (♀) pubescence. Wings pale yellowish grey or pale brownish, stigma a little darker; halteres pale yellowish or white.

Length, 9-10 mm

Described from a considerable number of both sexes in the Indian Museum, Pusa, and Debra Dun collections and my own. Common and widely distributed in India in May and July to October up to 5000 ft, also generally distributed in the East, Raugoon, Singapore (both Brunetti), Borneo, Java, Amboina, Aru Islands, Shanghai.

Bigot in 1887 described a second species, coming from North America, under the name pallipes.

## 54. Sargus mactans, Walk.

Surgus mactans, Walker, Proc. Linn. Soc. Lond. 1v, p. 97 (1860); Brunetta, Rec. Ind. Mus. i, p. 107 (1907), de Meijere, Tijd. v. Ent. hv, p. 263 (1911).

3. Head with frons extremely narrow, the sides never parallel, widening gradually above and below from point of nearest approach, whenever yellow or brassy, with yellow pubescence on vertical and frontal triangles; ocelli at some distance below vertex, upper ones contiguous to eye-margins; face, mouthopening, and proboscis yellowish orange, with a little vellowish hair; antennæ orange; occiput black, a fringe of whitish hairs on lower margin. Thorax with dorsum, pleura, scutellum, and metanotum brilliantly shining cupreous green, with rather dense soft yellow pubescence, which becomes whitish on anterior margin of dorsum; a shoulder-spot, a narrow stripe thence to wing-base, extending over upper part of sternopleura, brownish or yellowish. Abdomen brilliantly shining cupreous, sometimes with a green tinge, with rather dense yellow pubescence towards and at sides,

the pubescence in the middle of the segments almost microscopic, venter blackish, shining, with short soft yellow pubescence; genitalia with a violet tinge, rather small, with two terminal, cylindrical, palp-like lamellæ. Legs yellow, coxæ more or less black at base, especially hind pair, hind tibiæ slightly constricted just beyond middle, with nearly basal half black, hind tarsi with tips dark; all legs with minute bright yellow pubescence, which is longest on hind tibiæ Wings uniformly yellowish grey; stigma a little darker, brownish yellow, halteres yellowish

Length, 9-11 mm

Described from several specimens in the Indian Museum. Blum Tal, Kumaon, 4500 ft, 19-22 ix 1906 (Annandale); Almora, Kumaon, 5500 ft, 10-21.ix 1911 (Pava), Shillong, 4900 ft., 1. vi. 1918 (Rao); Katmandu, Nepal. It occurs also in Ceylon and the Malay Archipelago.

A variety with a black streak on the posterior femora (two specimens) was taken at Shillong, 5000 ft (Fletcher) and 4900 ft.,

30. v. 1918 (Rao).

#### Genus CHLOROMYIA, Dunc.

Chloromyra, Duncan, Mag Zool Bot. 1, p 164 (1837). Chrysomyra, Macquart, Hist Nat Ins. Dipt. 1, p 262 (1834). Myochrysa, Rondam, Dipt. Ital Prod 1v, p. 11 (1861). Myrochrysa, Verrall, apud Scudder, Nomen Zool p 204 (1882).

GENOTYPE, Musca formosa, Scop., by Verrall's designation (1909)

Differing from Sargus mainly in the densely pubescent eyes, which are contiguous for a considerable distance in the  $\sigma$ , the upper facets larger than the lower; and wide apart with equal-sized facets in the  $\mathfrak Q$ , 3rd antennal joint longer than in Sargus, abdomen rather broader also, especially in the  $\mathfrak Q$ , venation rather more indistinct

Range. Europe, South Africa, Asia, North America.

Life-history. The common C. formosu, Scop., of Europe, has

been bred from garden-mould and from Brassica rufa,

Some confusion has arisen over the generic names Uhloromyna and Chrysomyna (under which formosa was known in Europe for many years), which is concisely cleared up by Verrall (Brit. Flies, v, p 187) Coquillett claimed designation of the same species as generic type in 1910, presumably unaware of Verrall's priority.

## 55. Chloromyia sapphirina, Walk.

Surgus supphirmus, Walker, List Dipt. Brit. Mus. 111, p. 519 (1849).

"Body bright blue, tinged with purple; head as broad as chest, clypeus white; eyes dark bronze; mouth and feelers black; chest and abdomen fluely punctured, thinly clothed with short.

hoary hairs, abdomen nearly elliptical, a little broader and longer than the chest, legs blue, clothed with short heavy hairs, shanks and feet piceous, shanks pale yellow beneath, wings colourless, wing-ribs and veins dark tawny, poisers pale tawny. Length of the body 4 lines, of the wings 7 lines

"East Indies. From Archdencon Clerk's collection. In the British Museum."

Though described from the East Indies, it is probably from East India.

#### Genus BRACHYCARA, Thoms.

Brachycara, Thomson, Eng. Resa, p. 460 (1868) (1869)

GENOTYPE, Brachycara ventralis, Thoms.

Very near Chloromina. Head slightly narrower than thorax, nearly hemispherical, face not prominent, convex, mouth-opening large; proboscis short, labella broad, eyes bare Antenna short, 3rd joint almost transverse, obcoincal, a little shorter than 2nd, six-ringed, last two annulations abruptly narrower. Thorax with humen distinct; scutellum semicircular, unspined Abdomen oval, broader than thorax, 8-segmented, last three segments narrower, retracted. Legs moderately strong, slightly pubescent, anterior coxe small, subovate, very little distant from middle pair; hind pair subtriangular, femora clavate fusiform, tibic hardly shorter than femora, unspurred; tarsi hardly longer than tibie, 1st joint longer than the remaining joints together. Wings longer than abdomen

Range. B. ventralis is the only species

## 56. Brachycara ventralis, Thoms.

Brachycara ventralis, Thomson, Eug. Resa, p. 461 (1869), Brunetti, Rec Ind Mus. 1, p. 104 (1907).

3 2. Head shining, with alvery-white pubescence, thicker below; frontal triangle shining black, a small subtriangular white spot contiguous to each eye, from with a median furrow; eyes in o broadly contiguous, bare, proboscis yellowish white; antennæ brown, yellow in middle. Thorax and scutellim black, with depressed pubescence, which is golden brown and almost scale-like on the humeri; a narrow line on mesopleure whitish yellow. Abdomen yellowish red, a basal and apical blackish-brown spot, venter wholly shining yellowish red, with very short pubescence. Wings subhyaline, veins yellow; halteres pale yellow, clubs large. Legs yellowish red, all the tarsi and tips of hind tibiæ blackish brown.

Length, 5 mm

Cocos-Keeling Islands.

The foregoing is a translation of Thomson's description.

#### Genus PROSOPOCHRYSA, Mey.

Prosopochrysa, de Meijere, Tijd. v Ent 1, p 220 (1907).

GENOTYPE, Chrysochlora untripennis, Dol, by original designation

Near Microchrysa. Eyes bare, narrowly separated in 3, facets of equal size; occipital orbit extremely narrow; from prominent; antennæ rather short, 1st and 2nd joints subequal, 3id as long as first two together, with four annulations, the 4th the smallest, pubescent, arista practically apical. Thorax and abdomen subequally long, latter 5-segmented; scutellum unarmed. Third vein simple, 2nd nearly erect; discal cell 5-sided, only two veinlets issuing from it; the 3rd absent, and 3rd and 4th posterior cells therefore united.

Range. India, Java.

The absence of the 3rd veinlet from the discal cell might make the species appear to belong to the PACHYGASTRINE, but in that subfamily the fifth posterior cell is in full contact with the discal, through the posterior cross-vein being absent

### 57. Prosopochrysa vitripennis, Dol

Chrysochlora vitripennis, Doleschall, Nat. Tijd. Ned Ind. x, p. 408, pl. xi, fig 2 (1856)

Microchrysa albitarsis, Brunetti, Rec Ind Mus. viii, p. 156 (1913).

3 Q. Head of 3 with upper part of frons shining black or dark green, very elongate, and narrowed to point of nearest approach of eyes; below this point broad and prominent, brilliantly shining blue or violet; head below antennæ metallic bronze-green, with black or dark brown pubescence; cheeks

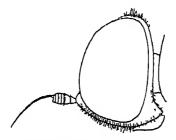


Fig 5 - Prosopochrysa untripenms, Dol, lateral view of head.

white-haired, proboscis black; occipital orbit very narrow, black, with whitish grey shimmer. Antennæ wholly brown, sometimes 1st joint blackish, 2nd and 3rd yellowish; latter with four annulations; arista long, practically apical, a little thickened basally where there are a few hairs on underside. In 2, from

one-fifth width of head, slightly tinged with blue, brilliant violet immediately above antenne. Thorax punctate, wholly brilliantly shining metallic blue or blue-green, with very short whitish pubescence. Abdomen metallic black or dark bronze-green, with very short sparse whitish pubescence, which is a little longer round margin and tip; venter darker, nearly black. Legs black, with microscopic pubescence. all the tarsi yellowish white except



Fig 6 -Prosopochiysa vitripennis, Dol., wing

at tips. Wings clear, veins and stigmatic region yellowish; 3rd vein simple, straight, ending at some distance before wing-tip; halteres apple-green.

Length, 5 mm.

Redescribed from two of and three QQ in the Indian Museum, and some in the Pusa collection

### Genus MICROCHRYSA, Lw.

Microchrysa, Loew, Verh zool.-bot. Ges Wien, v, p. 146 (1855); Brunetti, Rec Ind Mus. i, p. 103 (1907). Clorisoma, Rondani, Dipt Ital Prod i, p. 168 (1856). Chlorosia, Rondani, op. cit. iv, p. 11 (1861).

GENOTYPE, Musca polita, L. (Europe); by original designation.

Head broader than thorax, face small, slightly pubescent, occiput concave in  $\mathcal{S}$ , posterior eye-orbits distinct in  $\mathcal{Q}$ ; occili equidistant, eyes bare, in  $\mathcal{S}$  contiguous, upper facets larger than lower ones, in  $\mathcal{Q}$  widely separated, facets equal in size. Autennæ of typical Sargid form, 3rd joint with four annulations, arista practically apical. Thorax longer than broad, slightly wider behind, shining metallic, with short dense inconspicuous pubescence. Abdomen very short, rounded, shining, pubescence extremely short, though sometimes dense. Legs simple, tibus sometimes slightly dilated apically. Wings of normal Sargid type, terminations of 4th vein less parallel; thoracic squame more normally shaped than in Sargus, pubescent.

In all minor characters mainly as in Sargus.

Range. Europe, Asia, South Africa, North and South America.

Life-history. The common M. polita, L., of Europe, seems to breed freely in cow-dung and decaying vegetable matter.

M. calopa differs from M. flavventris, in which the abdomen is unicolorous, by a narrow pale border along the sides and tip.

### 58. Microchrysa flaviventris, Wied

Sargus flavventres, Wiedemann, Anal. Ent p 31 (1824). Microchrysa flaviventris, Brunetti, Rec. Ind. Mus. 1, p. 103 (1907) Sargus affinis, Wiedemann, loc cit., Brunetti, loc. cit. Chrysomyra annulipes, Thomson, Eugen Resa, p 461 (1869) Microchrysa gemma, Bigot, Ann Soc. Ent. France, (5) 17, p 231 (1879), Brunetti, Rec. Ind Mus. 1, p. 103 (1907).

¿ ♀. Head in ♂, vertex black, shining, with a few black hairs, ocelli distinct, red; eyes contiguous for rather more than half the distance from vertex to frontal triangle; upper facets bright brown, much larger than the blackish lower ones; from blackish, with a few short pale hairs; face brilliantly shining metallic green, bare, proboscis and palpi rather bright yellow, antenno pale yellow, with 1st and 2nd joints subequal, 3rd rather longer than 2nd, with pale yellow arista, occiput black, very concave, no definite postocular orbit. In 2, from forming one-third of the head, rather broader at vertex, brilliantly shining metallic blue-green, carried over the vertex to the blackish occiput and bearing a little short grey pubescence, remainder as in d. Thorax brilliantly shining metallic green, with very sparse pale yellow pubescence on dorsum and parts of the pleure; scutellum similarly coloured. Abdomen in & brownish yellow, varying to a little lighter or more reddish individually, with microscopic pale yellow pubescence, 5th segment blackish, venter yellowish, often more or less marked with black. In Q, brilliantly shining green, with microscopic pale yellow pubescence, venter generally brownish, sometimes yellowish or even metallic green. Legs pale yellow; hind femora with broad median brown band and hind tibiæ with broad apical band, both bands sometimes much Wings colourless, veins and the rather large stigma pale yellow; halteres yellow.

Length, 31-4 mm. .

Described from a considerable number of both sexes in the Pusa and Indian Museum collections and from other sources from many parts of India, dated March and from June to October. Also from Peradeniya, Ceylon, 15. vii. 1910, Java (Jacobson); Sibu, Sarawak, 2. vii. 1910 (Beebe). I have taken it myself in Mussoorie and Darjiling. Common and widely distributed in India and the East. Van der Wulp records it from Papua.

M. affinis, Wied, from East India, and M. gemma, Big, from

Ceylon, are probably synonyms.

# 59. Microchrysa calopa, Brun.

Microchrysa calopa, Brunetti, Rec. Ind. Mus. vii, p. 458 (1912).

Q. Head with from broad, bright metallic green on vertex. changing insensibly to brilliant violet-blue just above antenna, with very short pale yellow pubescence; face metallic green; oral opening brown; eyes dark brown, the upper corners rounded off, BERINÆ. 89

thus widening the vertex considerably; occupit dark; antenno pale yellow, tip of 31d joint, which has a slight reddish tinge, shortly pubescent; 1st and 2nd joints with one or two microscopic hairs Thorax with doisum brilliant metallic green, with very short pale yellow pubescence, venter similarly coloured and pubescent, sharply delimited from the dorsum by a narrow yellow side-ridge at the level of the wings; posterior calli yellowish Scutellum and metanotum brilliant green, the former with pale yellow hairs and yellow underside Abdomen dorsally violet, not intense, shining, and with a bluish tinge in certain lights, with pale vellow pubescence, the colour covers all the surface except a narrow, irregular, yellow border round the edges, venter yellow, shortly pubescent. Legs wholly yellow, except a broad brown ring on distal half of hind femora, and the blackish hind metatarsus Wings clear, stigmatic area pale vellow; halteres deep yellow.

Length, 3 mm.

Described from two Q Q in good condition in the Indian Museum, from Margherita, Assam, and Paresnath, Chota Nagpur, 4400 ft., v. 1909 (Dr. Jenkins).

## Subfamily BERINÆ.

Head semicircular; eyes large and prominent, bare or hairy. antenne with 3rd joint moderately elongate and more or less cylindrical, but not conspicuously so, with eight annulations and no apical style or arista. Thorax roughly oblong, scutellum generally with four or six marginal spines, occasionally eight, and in individuals an odd number may occur, pubescence of thorax continued over spines. Abdomen with at least seven obvious segments, longer than thorax, dorsum flattened, sides approximately parallel. Legs simple, moderately strong, 1st joint of hind tarsi generally dilated in d, spurs on middle tibise in rare cases. Wings not of the normal Strationiyid type, all the veins, except an occasionally obviously abortive one, running out to wing-margin; 2nd vein short, beginning opposite base of discal cell, ending near tip of 1st; 3rd vein forked, both branches ending before wingtip; 4th vein with only two terminations (as in Pacificantine), as the 5th vein forms the hinder side of the discal cell; posterior cross-vein therefore absent; anal cell closed at some distance trom wing-border; squamæ small.

This subfamily is easily distinguished from all others except XYLOMYINA by the 7-segmented abdomen and by the anterior veins not being crowded together; whilst from the XYLOMYINA it is separated by the 2nd vein (præfurca) originating opposite the base of the discal cell instead of at some considerable distance before it, also by the open 4th posterior cell. Their usually

<sup>\*</sup> Acanthomyra, for instance, a European genus.

meous or metallic colour also renders them conspicuous, and though in this they resemble the Samein i, the latter are always easily known by the anterior cross-vein connecting the discal cell with the præfurca instead of with the 3rd vein. The frequently dilated hind metatarsus in the 3 is a further character of the Been m.

The life-histories of a few European species are known, but not that of *Berns*. That of *Chornsops tibialis* has been described by Handlirsch. The larve live in the earth and decaying matter-

## Table of Genera.

Scutellum unspined	Allognosta, Ost-Sack., p. 93.
Scutellum spined	
Palpi minute or obsolete, eyes con-	
tiguous in d	Beris, Latr., p 90.
Palpi rather long, eyes not con-	
tiguous in d	CHORISOPS, Rond., p. 92.
	, , , ,

#### Genus BERIS, Latr.

Bens, Latrelle, Hist Nat Crust. Ins. 11, p 447 (1802).

Oplacantha, Rondam, Arch Zool. Modena, 11, p 87 (1863).

Heracantha, Lioy, Atti Ist. Ven (3) 1x, p 586 (1864)

Octacantha, Lioy, loc. cii

GENOTYPE, Musca chalybeata, Forst., as Strationys 6-dentata, F. (Europe), by original designation.

Head almost semicircular, transverse, as broad as thorax; face short, pubescent, eyes large, contiguous in d (with rare exceptions), wide apart in Q, densely hairy in J, upper facets larger than lower, less harry in Q with all equal facets Proboscis well developed, palpi rudimentary. Antennæ porrect, nearly as long as head, two basal joints short, subequal, bristly, 3rd clongato with eight annulations, the first and last being the longest. Thoraw rather arched, closely pubescent in d, less so in Q; scutellum with four to eight spines bearing pubescence (occasionally an odd number in individuals). Abdomen hardly broader than thorax, flattened, sides nearly parallel, at least 7-segmented; genitalia more developed than in the other subfamilies Legs simple, of moderate size; hind metatarsus dilated in d and elongate in both sexes. Wings longer than abdomen, not of the typical Strationyid nature, anterior veins not crowded together, all veins distinct and generally reaching wing-margin; 2nd vein rather short, enclosing the conspicuous large dark stigma; 3rd vein rather widely forked, both branches ending before wing-tip; 4th vein with only two terminations and occasionally an abortive third, posterior cross-vein absent as upper branch of 5th vein forms hinder side of discal cell; anal cell closed at some distance from border of wing. Alar squame of moderate size, thoracic ones undeveloped,

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Range Europe, Orient, Australia, North and South America Life-history. The European B chalybeata has been bred from moss, but the metamorphoses of the genus are not well known. The perfect insects prefer marshy situations, but are generally distributed. Col. Yerbury records the males of some British species as performing a rather wild aerial dance.

### 60. Beris geniculata, Curt

Berns geniculata, Curtis, Brit. Ent vin, p. 337 (1830).

J Q. Head. from in J rather large, shining black, with a depressed median channel on upper part, face and lower part of head shining black, from and face with rather dense blackish-brown pubescence, vertex wholly occupied by the considerably elevated ocellar triangle, bearing blackish-brown hairs, proboscis black, labella orange, palpi black; eyes contiguous for a considerable distance, with dense blackish-brown pubescence on front part, less dense on rest of surface, facets of upper half much larger than the others, antennæ black; 3rd joint not quite twice as long as the 1st and 2nd put together,\* greyish on inner side about the middle, tapering to tip after about 3rd or 4th annulation, extreme tip with two or three minute bristles. In 2, from nearly one-third of head, shining black, as is the face, both with short pale pubescence, eyes with very short pubescence. Thorax and scutellum metallic shining green or blue-green, the former disfinctly punctate except towards hind margin; scutellum impunctate, both with rather dense blackish pubescence, which is less dense on scutellum, the latter with eight shining green spines (normally in European specimens only six). In the 2, pubescence on dorsum of thorax pale and short, rather depressed. Abdomen very dark brown, nearly black, with rather long pubescence towards sides, which is brownish in &, pale yellowish and much shorter in 2; venter shining brown; genitalia rather small Legs very dark brown, tips of femora narrowly orange; base of tibia orange to about one-third on anterior legs and to a quarter on hind pair; anterior metatarsi pale, rest of tarsi black, hind metatarsi pale, considerably and equally dilated throughout their length except at base and tips, longer than four remaining joints together, the latter black. Wings brown, costal cell a little paler; stigma large, dark brown, oval; in Q wings clearer, halteres brownish orange.

Length, 4-5 mm

<sup>\*</sup> A slight error as to the length of the 3rd antennal joint seems to have crept into Verrall's usually scrupulously correct writings, as he contradicts himself in the table of species and the description. The discrepancy may not be important,

Described from a d and two 2 2 in the Indian Museum taken

by me at Darpling, 6900 ft., 2. x 1908.

Whether this species is the true *B. genuclitia* of Curtis is not quite certain, as though it agrees in practically all other points, the difference in the width of the frons in the Q is important less than one-fourth the width of the head in true *geniculata* and nearly one-third in the present form. My specimens are also distinctly a size smaller, 4-5 mm. against about 6 *B. geniculata*, Curt, is recorded from Central and Southern Europe.

### 61. Beris annulipes, Brun.

Beris annulipes, Brunetti, Rec. Ind. Mus vn, p 455 (1912)

Q. Head with frons nearly one-fourth the width of the head: brilliantly shining, dark blue, uniformly wide, occiput shining black, with a little grey hair on posterior ocular orbits, eyes very shortly but distinctly pubescent, proboscis reddish vellow. Antennæ with first two joints black, with bustly hairs, 3rd joint vellowish on basal, black on apical half; a little grey hair about the base of the antennæ. Thorax brilliantly shining violet-blue, with yellow pubescence on dorsum; scutellum brilliantly shining peacock (greenish) blue, with six strong equidistant slinning darker green spines on hind margin. Abdomen violet, moderately shining, sides with brownish yellow pubescence, venter darker, with short Legs yellow; tips of anterior femora with an indisvellow hairs tinet brown band; hind femora and tibie with a distinct broad brown apical band on each; tarsi marked extensively with brown. Wings grey, upper part (except costal cell), as far hudwards as to include the anterior basal and first posterior cells, brown; halteres yellow.

Length, 61 mm.

Described from one example taken by me at Darjiling, 7000 it., 27. v 1910; in the Indian Museum.

## Genus CHORISOPS, Rond.

Chorusops, Rondani, Dipt. Ital Prod. i, p. 178 (1856). Chlorusops, Brauer, Denks. Ak. Wien, xliv, p. 72 (1882).

GENOTYPE, Beris tibialis, Mg.; by original designation.

Differing from Bers by the palpi being elongate, as long as proboscis, and the eyes in the & distinctly though rather narrowly separated. Eyes bare in both sexes. Scutellum with four yellowish spines Genitalia in & very protruding. Hind tibise incrassated after the base, especially in &. Wings with 3rd vein more shortly forked, 4th vein with an abortive 3rd termination, lower branch of 5th vein much curved, closing anal cell far before the wingborder; stigma very distinct

Range. Europe, India, Chile.

Life-listory The metamorphoses of C. tibialis have been well described by Handhrsch.\*

### 62. Chorisops tibialis, Mg.

Beris tibialis, Meigen, Syst. Beschr ii, p. 3, pl. xii, fig. 8 (1820).
Chorisops tibialis, Brunetti, Rec. Ind. Mus. vii, p. 456 (1912)
Actina hyaliventiis, A. Costa, Il Giamb Vico Napoli, ii, p. 455 (1857)

♂ ♀ Head. from shining in ♂, blue-black or dark green, oneeighth width of head at vertex, narrowing to half that width on lower halt; in 2 about one-fifth of head at vertex, slightly narrowing downwards, greenish black; vertex with black hairs, from with pule pubescence, face shining white, proboscis dull orange, palpi yellowish, poirect, distinct, eyes bare, facets all equal. Autenna rather longer than head (longer still in 9), brownish black, pale below towards base, variable, 3rd joint 8-annulated Thorax and scutellum brilliant sliming green, finely punctate, with fine yellow pubescence; pleure with pale pubescence, middle part of mesopleara bare, scatellar spines yellow, with a long apical huir (besides other hairs), humen yellowish in Q. Abdomen black, moderately shining, more or less yellowish on the disc (especially in the 9), including generally the greater part of the 3rd and 4th segments, pubescence short and dark, pale yellow at sides down to 4th segment, venter more yellowish than dorsum, genitalia very distinct, and protruding, connected with last abdominal segment by a short neck Legs yellow to dull orange, tarsi blackish from tip of 1st joint, hind femora brownish yellow, variable, hind tibue mainly blackish brown, considerably meras sated after the base, hind tarsi rather short, 1st joint incrassate, as long as remaining joints together; pubescence of legs pale yellow; Q with legs paler than in the 3. Wings with a laint brown suffusion, stigma large, dark brown, sometimes paler in 2, halteres yellow, with large knobs.

Length, 6 mm

The above description is abridged from Verrall.+

Binsar, Kumaon Distr., W. Ilimalayas, 28, v. 1912 (Dr. A. D. Imms)

#### Genus ALLOGNOSTA, O.S.

Allognosta, Osten-Sacken, Berl Ent. Zeits. xxvi, p 297 (1883) Metoponia, Loew (nec Macq.), Dipt.-Faun. Sudafr i, p. 1 (1860)

Genotype, Beris fuscitaries, Say; by designation of Coquillett, 1910.

of Q. Head transverse, rather flattened, as broad as thorax; eyes contiguous in of; from an Q rather prominent, convex (in assamenses), between one-third and one-fourth width of head. Antennæ set at middle of head in profile; scapal joints subequal,

\* Verli zool.-bot. Ges. Wien, xxxii, p. 243 (1883) i British Flies, Stratiomyides, &c., v, p. 214 (1909) cylindrical, 3rd with eight annulations, 1st the largest, about as large as 2nd scapal joint, iemainder annular, slightly narrowing in width towards tip Proboscis and palpi short, latter not extending beyond epistoma Thorax subquadrate, corners rather angular, rather broader behind. Scutellum fully semicircular, convex, unarmed. Abdomen longer and slightly wider than thorax, ovate, with tip rather pointed, 8-segmented; genitalia small. Legs simple, moderately long and strong. Wings with normal Berid venation; 2nd vein rather sharply upturned towards tip; anterior branch of 3rd vein nearly erect; only three endings to 4th vein, discal cell large, hexagonal, anterior cross-vein just beyond base, posterior cross-vein at about the middle, anal cell large, closed a long way before border

Range Europe, India, America.

No previous description of the genus appears to have been given Loew placed certain new species in what he took to be \*Metopoma\*, Macq, but Osten-Sacken in pointing out his mustake merely renamed \*Metoponia\*, Lw., as \*Allognosta\*, without characterising it, as he had no specimens available of the genus at the time \*

In A vagans the legs are all black except at the knees, in A. assumensis the anterior femora and middle tibue are yellow.

## 63. Allognosta vagans, Lw. (Pl. 1, figs. 25, 26.)

Metoponia vagans, Loew, Besch Europ Dipt iii, p. 71 (1873) Allognosta inermis, Brunetti, Rec Ind Mus vii, p. 455 (1912).

d Head with vertex very small, occupied by the three ocelli. eyes with uniform, very small facets, bare, contiguous, from an equilateral triungle, moderately large, blackish seen from above, but with grey reflections viewed from other directions, occuput blackish Antennæ black, normal, as in Beris, the 3rd joint with seven annular impressions, appearing as if composed of eight closely compressed joints. Palpi and proboscis black, the underside of the large labella yellowish. Thoraw and scutellum blackish, with a slight æneous tinge, microscopically roughened, and with microscopic yellow hairs, the anterior margin and shoulders with a very little short yellowish hair, which extends also over the pleuræ to some extent Scutellum unspined, with increscopic Abdomen dull black, barely shining, the sides with vellow bairs very short yellow hairs, venter similar, with very minute yellow Genitalia consisting of a pair of blackish, fairly thick claspers, each with a small narrow appendage; there being also an upper pair of yellow, harry, finger-like appendages black, the knees distinctly but not broadly yellowish brown; pulvilli pale yellowish Wings blackish brown, stigma large, well defined, brown; halteres black.

<sup>\*</sup> As to the supposed identity of Metoponia, Macq, and Metoponia, La., see Brunetti, Rec Ind. Mus vii, p 455.

Longth, 44 mm

Described from a unique of in the Indian Museum taken by me at Dariling, 7000 it., 29 v. 1910. I found the species not uncommon at Hankow, China, 22-26. iv. 1906.

### 64. Allognosta assamensis, sp. nov.

9 Head as broad as thorax; from very retreating, slightly swollen on upper corners, where it projects above eyes in profile, forming half width of head, black, shining, parallel-sided, closely punctulate, and with almost microscopic brownish pubescence; lower part smooth, vertical triangle small and low; ocelli inconspicuous; face as broad as frons, sides parallel, shining black, bare; two large, dull grey tomentose spots placed diagonally just below base of antenne, their upper corners nearly touching; proboscis brownsh black, palpi black, rather long; occiput black; eyes baie, small, only a little over half height of head; posterior orbits on upper halt only, rapidly diminishing and disappearing at about Antenne placed below middle of head in profile; middle of eve first two joints subequal, cylindrical, pale yellow, 3rd with eight annulations, 1st annulation broadest and longest; basal part of flagellum brownish yellow, gradually becoming blackish at tip. Thorax subquadrate, barely wider behind, front corners rather angular, hind corners cut away by the very distinct brown posterior cally: dorsum thickly nunctulate, with very short soft yellowishbrown pubescence, the moderate-sized semicircular scutellum and the pleure similarly clothed, black, a broad yellowish-white stripe on upper part of latter from anterior margin to wing-base; metanotum small, dull brown Abdomen 8-segmented, practically bare, 1st and 2nd segments almost coalescent, 6th distinctly narrower than 5th, and the 7th and 8th narrower than 6th, all blackish brown, or even slightly violet-tinged; middle half of 1st, 2nd, and 3rd yellowish (the pale part probably variable in extent), venter mainly yellowish, but blackish at sides and tip. Legs mainly vellow, apical three-fourths of front tibia and all front tarsi, last three joints of middle tarsi, apical half of hind femora, hind tibix (except narrowly at base), and last two joints of hind tarsi black. Wings pale smoke-grey, a very little darker at tip; stigma large, black, conspicuous, clearly demarcated and filling all marginal cell except extreme tip, which is slightly yellowish, as is also the costa for a very short distance at this point: 1st submarginal cell practically clear, except at the very narrow base and extreme up, thus in striking contrast to the dark contiguous stigma, extreme base of wing clear; 5th and 6th veins yellow, remainder dark brown; halteres with stem yellowish white, clubs large, oval, black.

Length barely 5 mm.

Described from a single Q in the Indian Museum from above Tura, Garo Hills, Assam, 3500-3900 ft., viii 1917 (Kemp).

## Subfamily XYLOMYINÆ

Head with eyes separated in both sexex; face depressed in middle, palpi elongate and upturned; antennal 3rd joint elongato, with eight annulations and generally a minute apical bristle. Thorax practically bare, subquadrate, scutellum unspined Abdomen of 7 to 9 segments, elongate, longer than thorax, with nearly parallel sides, genitalia of d conspicuous. Legs moderately long. and stout, bare or nearly so, hind femora often incressate or spinose below, posterior tibio with two spurs. Wings not of the normal Stratiomyid type, all the veins reaching wing-margin, the antenor verns not crowded together, 2nd vern (prefurea) originating some distance before base of discal cell, the latter much more elongate than in any other subfamily, costal vein complete, ambient vein present for at least some further distance; 3rd vem with an elongate fork, lower branch ending at about wing-tip, 4th vein with three terminations; 4th posterior cell closed near wing-border, a special character of this subfamily, five posterior cells, posterior cross-vein normally present, but in some species the contact of upper branch of 5th year with discal cell is practically punctiform, in which case cross-vein absent; alar squamæ very small, thoracic squamæ absent

The XYLOMYINE resemble the BERINE more than any other subfamily, and the principal distinguishing characters are given under BERINE. Further characters of the XYLOMYINE are the depressed face, the much more elongate discal cell, the unspined scutellium, the non-metallic or seneous nature of the species, and the undilated metatarsus in the 3. They are mostly yellow, somewhat Ichneumon-like flies, and sparsely pubescent.

#### Genus XYLOMYIA, Rond.

Xylomya, Rondam, Dipt Ital Prod. 1v, p. 11 (1861).
Subula, Megerle in Meigen, Syst. Besch. 11, p. 15 (1820).
Solva, Walker, Proc. Linn. Soc. Lond. 1v, p. 98 (1860).
Macroceromys, Bigot, Bull Soc. Ent. France, (5) vii, p. lakin (1877).
Subulaomya, Wilhston, Man. N. Amer. Dipt. p. 43 (1896)
Xylomya, de Meijere, Tijd. v. Ent. i, p. 217 (1907)

GENOTYPE, Xylomyra is a nom. nov. for Subula, Mg., of which Rondam gave varia, Meg. in Mg., as type.

Head transverse, as wide as thorax; from flush with eyes or slightly depressed; face distinctly depressed about the middle;



Fig 7 -- Aylonyia, antenna

eyes bare, well separated in  $\sigma$ , still more so in  $\Omega$ ; proboscis prominent; palpi 2-jointed, cylindrical, rather long, directed upwards. Antennæ elongate, as long as or longer than head, first

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two joints short, subequal, 3rd with eight annulations and usually a very small apical bristle Thorax oval and subquadrate, slightly arched; scutellum unspined Abdomen longer than thorax and about as wide, 7-segmented, genitalia distinct. Legs rather long, simple, except for the slight incrassation of the femora, especially the hind pair, which are considerably thickened in some species and often with a row of small spines on underside; posterior tibio Wings longer than abdomen, not of the normal with two spuis Strationized type, veins not crowded together anteriorly, all distinct and attaining wing-margin; costal vein reaching wingtip, ambient vein present for some distance; 2nd vein beginning distinctly before base of discal cell, 3rd vein originating shortly after, the fork elongate, the lower branch ending at wing-tip; discal cell much more elongate than in any other subfamily; 4th vem with three terminations, the lowest one closing the 4th posterior cell at wing-border, posterior cross-vein very short or absent, anal cell closed distinctly but not considerably before wing-border, alar squamæ small, thoracic pair absent.



Fig 8 .- Xylomyra, wing

Range. Europe, the Orient, North, Central, and South America, Canary Isles, and Natal.

Life-history Larva amphipmenstic (though Lundbeck doubts if it is truly so), broad, brown, leathery, with parallel sides, upper and lower surfaces with bristles placed transversely on segments, 12-segmented, including head, which is broadly conical, mouthparts normally Stratiomyid; last body-segment semicucular, orifice of respiratory chamber torming posterior extremity of body. It lives in old trees or decaying wood.

Xylomyia is a genus of yellow and black, rather Ichneumon-like thes, with considerable outward resemblance to Xylophagus (LWFIID.E), but the closed 4th posterior cell will easily distinguish them. The species seem to be much rarer in the adult than in the larval stage. Solva, Walker, antedates Xylomyia by one year, but as the subfamily name is constructed from the latter it should be retained.

## Table of Species

### 65. Xylomyia flavipes, Dol.

Subula flavipes, Doleschall, Nat Tijd. Ned Ind avii, p 85 (1858). Xylomyia flavipes, Brunetti, Rec Ind. Mus 1, p 87 (1907).

Head with frons one-sixth width of head, barely wider on lower part than at vertex, black, with a little bright yellow pubescence and some whitish pubescence just above antennæ; face black, with a little whitish pubescence, more conspicuous near eyemarguis, occiput black, practically bare, antennæ and palpi wholly orange-yellow. Thorax black, dorsum and pleuræ with very short yellow pubescence, minutely punctulate; humer and a ridge thence to wing-base, also the scutellum bright yellow. Abdomen yellow, punctulate like thorax; a large dark blackish-brown spot on each segment, leaving only the sides and hind margin of each narrowly pale; genitalia very small; venter much as doisum, but the yellow of greater extent. Legs yellow, extieme tip of underside of hind temora very dark brown Wings nearly clear, yenation normal, vens brown, halteres yellow

Length, 4 mm.

Described from several specimens in the Pusa collection from Chapra, Bengal (Mackenzie)

### 66. Xylomyia calopodata, Big

Subulu calopodata, Bigot, Ann. Soc. Ent. France, (5) 11, p. 195 (1879)

Xylomyia calopodata, Brunetti, Rec. Ind. Mus. 1, p. 87 (1907)

Head with from above antennæ one-fourth width of head, a little narrower at vertex, black, with grey or yellowish grey pubescence, ocellar triangle slightly elevated, rather large, black; ocelli yellowish; tace apparently dark, with a little whitish pubescence, labella very large, dark reddish brown, palpi very large and prominent, sharply upturned, hiding all the face, bright yellow; occiput daik, grey-dusted, with a fringe of whitish pubescence, which dies away on upper margin and is longest on lower part, antenuæ dark brown, underside, especially on basal half, yellowish. Thorax black, slightly shining, closely punctulate, with minute black bristles and very short yellowish-grey pubescence, which also covers the greater part of the pleure; humeri prominent, bright yellow, with a ridge thence to wing-base, scutellum vellowish; metanotum black. Abdomen black, slightly shining closely punctulate, with minute black bristles and soft short yellow pubescence; hind margin of each segment except 1st narrowly but distinctly yellow, bare and shining; venter similar; genitalia rather small. Legs bright yellow, with microscopic pale nubescence, tips of femora (and for a rather greater distance on underside) also very narrowly at base, tips of hind tibise broadly, anterior tarsi on apical half, and hind tarsi entirely black. Wings

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clear. highly iridescent, venation normal, veins dark brown, halteres yellow.

Length, 9 mm.

Described from a single specimen in the Indian Museum, from Nami Tal, W. Himalayas, 6000 ft, 5. vi. 1909; a second specimen from Shillong, 5000 ft (Fletcher).

### 67 Xylomyia nigricornis, sp nov

Q. Head with trons gradually widening from vertex to above antennie, where it is barely one-fifth the width of the head, wholly covered with yellowish pubescence, except immediately above antenna, where the pubescence is yellowish white, vertex dark grev tomentose, with golden-yellow pubescence; ocelli not very conspicuous; face with nearly parallel sides, fractionally wider than lower part of frons, black, with greyish or yellowish grey pubescence, inner margin of eye slightly cut away a little above antenne, at a spot where there is a peculiar and conspicuous shining, black, smooth, elongate, triangular space devoid of facets. antennæ blackish brown, a little pale about inner and under side of 2nd scapal and 1st flagellar joints, proboscis orange-brown, pulpi bright lemon-yellow, very large and erect, nearly hiding the face, occiput grey-tomentose, with some golden-yellow hairs on margin, and longer ones just behind vertex. Thorax black, thickly punctulate, with black bristles; seen from the front only there are three longitudinal stripes of almost microscopic golden-yellow pubescence, humen conspicuous, bright yellow, a thin dull yellow line thence to wing-base, hind corners of dorsum margined with brown; pleuræ black, closely punctulate, with black bristles and very short whitish pubescence, scutellum bright lemon-yellow, with lemon-yellow bristles, the base narrowly black; metanotum Abdomen distinctly 7-segmented, 1st and 2nd scarcely separable except by the fringe of hairs on hind border of 1st, 1st segment orange-yellow, hind border broadly black, 2nd orangevellow, with a large round black spot in middle just clear of the margins, hind margin vellowish white; rest of segments black, hand margin of 3rd to 6th inclusive yellowish white, clearly demancated; sides of very small 7th segment yellowish; all the black parts of abdomen closely punctulate, with minute black bristles, the vellow parts with short pale vellow hairs; genitalia very small, a pair of small brownish-yellow lamellæ; a little pale, rather long pubescence at sides of 1st segment, and shorter similar pubescence on sides of whole abdomen, venter black, 2nd segment and hind margins of remainder yellowish. Legs mainly yellow, hind coxe (except a patch on hinder side), hand trochanters, underside of hind femora narrowly, inner and outer sides of same towards base (the colour almost united on upper side), also extreme tips, black; anterior tarsi brownish black; hind tibie and tarsi black, except upper side of former at base. Wings uniformly yellowish grey; 100 Lettid E

stigma small, brownish, 4th posterior cell closed distinctly but shortly before wing-holder, halteres brownish yellow.

Length, 11 mm.

Described from a unique perfect  $\mathfrak{P}$  in the Indian Museum, from above Tura, Garo Hills, Assam, 3900 ft., viii. 1917 (Kemp).

# Family LEPTIDÆ.

Head semicircular, short, rather flattened in front, as broad as or narrower than thorax, from at vertex nearly level with the eyes, face short, "usually with a socketed middle part (epistoma) on which there is usually a rounded raised tubercle" (Verrall); cheeks more conspicuous in some genera than others. Eyes bare (except in one non-Indian genus Canomyra and in Canomyrodes, gen. nov.); contiguous or subcontiguous in d, distinctly, sometimes widely separated in the  $\Omega$ ; in a few cases the frons of about equal width in both sexes; upper facets in o often much larger than lower ones, the eyes in life in some species brilliant green, three ocelli. Proboscis generally robust, sometimes very large, though short, labella prominent, palpi moderately long, slender. Antennæ very variable, in the typical Larridz with 3rd joint simple, short-conical, round, or remform, with a bristle or style which is usually terminal, but in some genera is dorsal. \* third joint flagelliform and annulated in XYLOPHAGINE. Thorax a little longer than the head, roughly oval or oblong, with rounded corners, generally widest at the middle; scutellum moderately large, rounded or semicircular, metanotum larger and more conspicuous in Xylophaginh than in most Leptinæ Abdomen 7-segmented, elongate or control, longest and nearly cylindrical in some of XYLOPHAGINE. Legs rather long and slender, often minutely bristly on the tibiæ or below the femora; front come rather elongate, fore tibies with or without a single spur, middle tibiæ always with two spurs, hind tibiæ always with one or two spuis, exceptions being rare, pulvilli three, empodium pad-like. Wings glabrous, but minutely pubescent under high microscopic power, somewhat broad, with more or less rounded tips. Auxiliary and 1st longitudinal vein somewhat approximate, always ending beyond middle of wing; 2nd longitudinal beginning at from onethird to one-half the length of the wing, ending not far beyond tip of 1st, often dipped towards tip to embrace the generally obvious stigma; 3rd vein begins a little beyond the 2nd, (almost always) practically in a line with the base of the discal cell; always forked, the fork varying in length + and in width of

t It is long and narrow in Symphoromina, and short and wide open in Hilan morpha, neither of these genera being Oriental

<sup>\*</sup> Williston figures the antenna of Atherix with the arista absolutely basal; Verrall evidently claims the most distant point horizontally as the true tip and considers the 3rd joint produced downwards. Most authors, I believe, regard as the tip the extremity of its greatest length, as I do here, it can be accepted either way, but misunderstandings may arise.

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opening, but always embracing the wing-tip. Discal cell always present, except in Ililarimorpha (non-Oriental); anterior crossvein near basal end of discal cell, always before its middle, 4th longitudinal with anterior branch forked, lower branch simple, posterior cross-vein nearly opposite anterior cross-vein, 5th longitudinal forked at about its middle, the upper branch more or less curved or angled at the point where it meets the posterior cross-vein, 6th vein complete. Two submarginal cells, 5 posterior cells, anal cell open or closed, alube of moderate size, generally well developed, absent in Xylophaeinæ; alar squame rather small, thoracic squame absent, "but the frenum distinct and developing a rather broadened membrane near the angle;" halteres distinct, stem rather long.

The whole body in LEPTIDE is usually clothed with soft pubescence, microscopically so on the often apparently bare legs. There are no bristles of a chætotactic nature, though a few short ones or bristly hairs often occur about the thorax, wing-roots, and

metapleura.

Lefe-listory. The metamorphoses of many European species are more or less known † Larva amphipmenstic, with parchiment-like skin, generally living under bark, in moss, or earthy matter, predaceous on Coleopterous larvae and other soft-wood insects, though some are aquatic. Twelve-segmented, including head, which is exserted though small, long, pointed, the mouth-parts very small; the three thoracic segments with strongly chitinized dorsal areas, the prothologic segment also hardened beneath, last segment with a strongly chitinized area on hinder part, with two strong hooks, this area also bearing two spiracles. Abdominal segments often with transverse swellings on lower surface, locomotion being effected by means of these, which take the form of roughened intercalated spaces between the segments, though Brauer affirms that true pseudopods exist in Atherer.

The perfect insects are found usually in open woods and the meadow-lands in their vicinity, or in marshy and soft places,

being fond of resting on tree-trunks.

With the exception of one or two North-American biting species of Symphoromyia, which bite like Tabanida, the Luptina:

are harmless to mankind.1

The LEPTIDE are rather closely allied to both the STRATIOMYIDE and the TABANIDE, but the former are easily known by the crowding of the venation on the front part of the wing (except in Berine) and by the shape of the discal cell, which is always small, and seldom much longer than wide (except in Xylomyia), at

\* In one or two European species of Xyloplagus, the lower branch of the 3rd vein may in individual specimens occasionally end barely above the wing-tip.

<sup>†</sup> Atherix ibis, Xylophayus ater, Leptis tringuria, L. soolopacea, etc. ‡ [Five species of blood-sucking Leptids have been described by White and Feiguson from Australia and Tasmania, all belonging to the genus Spaniopsis, White; Trichopalpus obscurus, Phil., has been noted as a greedy blood-sucker in Chile, and Leptis scolopacea, L., and L. striposa, Mg, have been recorded as biting man in France,—Bd.]

most about one and a half times. In LEPTIDE the discal cell is distinctly oblong and always more than twice as long as wide. The only two genera about which doubt might arise would be Xylophagus and Xylomyia.\* The TABANIDE, though possessing the same venation as the LEPTIDE, may at once be recognized by the characteristic antennæ and their more robust structure throughout.

#### Table of Subfamilies.

1.	Third antennal joint flagelliform, more or less elongate, annulated, without arista Third antennal joint not flagelliform, short, or but little elongated, rounded, conical, or	2
	reniform, never distinctly annulated, arista	
	always present	4
2.	always present	3
	Front tibes without spurs	ARTHROCERATINA
3	The 5th posterior cell in broad contact with	
	discal cell, face with rounded socketed	
	epistoma, margined by broad side-cheeks,	
	eyes in o contiguous, scutellum with two	
		C GENOMYIN A:
	The 5th posterior cell not touching discal cell,	
	face flat, epistoma not socketed or margined	
	by broad side-cheeks, eyes in & well sepa-	
		$\mathbf{X}_{\mathbf{YLOPIIAGIN}E}$ .
4	Eyes in & wide apart, 3rd vein widely forked	
	at much beyond half its length, face not at	**
	all socketed	VERMILEONINE,
	Eyes in & contiguous, 3rd vein less widely	
	forked before, or at latest at, half its length,	
	face with rounded socketed epistoma	Lrptin <i>i</i> e

In few families of Diptera is there such diversity of opinion with regard to the subfamilies as in the present one. Prof. Kertész, in his 'Catalogue of Diptera,' admits none at all, but ranks XYLOPHAGIDÆ (including Xylomyia and Conomyidæ) as separate families. Verrall recognises the four last subfamilies presented here with Chrisophinæ as a fifth, Williston divides the Leptidæ into three (dealing with North-American species only), XYLOPHAGINÆ (including Conomyia), ARTHROOMRATINÆ (including Xylomyia), and Leptinæ. Beling has shown the affinity between Conomyia and Xylophagus in their larval stages.

Verrall divides the XYLOPHAGINE and VERMILEONINE, taken together, from the CCNOMYINE and LEPTINE (with CHRISOPILINE) as an additional subfamily), taken together, by the characters of the face, afterwards distinguishing those of each group from one another by antennal characters; but the system herein presented is adopted on account of less indecision being likely to arise as to the nature of the antennæ than the degree of prominence of the face.

The ARTHROCERATINE as a subfamily are rather difficult for me to judge personally, since no example is available for actual

<sup>\*</sup> See XYLOPHAGINE (p 104) and Xylomyia (p. 96) respectively.

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examination, except two genera of my own that I have attributed to it. Williston admits the subfamily, but includes *Xylomyia*, which is essentially a Strationizid, whilst *Glutops*, the only other North-American genus, except *Arthrocerus* itself, has given use to some discussion as to its exact position.

The Comomying are large, heavy, rather bare, and Tabanid-

like flies with comparatively short legs

The Vermileoning are not Oriental, so only a passing note need be given them here. They differ from the Leptings by the eyes being wide apart in both sexes, by a different structure of the face, and, to a less extent, the body. The 3rd longitudinal vein forks later and more widely, and the wings are cuneiform at their bases, without alule, the venation, though technically normal, shows minor variations

### Table of Indian Subfamilies and Genera.

	•	
1.	Antennæ palpably elongate, 3rd antennal joint distinctly annulated, no arista Antennæ not palpably elongate, 3rd antennal	2
2	joint never annulated, but rounded, conical, or remiform, arista present. (LEPTINE).	5
-	style	3
	Fore tibes without spurs, 3rd antennal joint	
	with a style-like prolongation (absent in Pararthropeus) (ARTHROCERATINE).	4
3,	Fifth posterior cell in broad contact with	•
	discal cell, face with rounded socketed	
	epistoma margined by broad side-cheeks, eyes in d'contiguous, scutellum with two	[nov., p 110.
	short blunt spines. (COMONYINA)	Cornomyiodré, gen.
	Fifth posterior cell not touching discal cell; face flat, epistoma not socketed or mar-	
	gined by broad side-cheeks, eyes in &	
	well separated, scutellum without spines.	[p 104.
4.	(XYLOPHAGINÆ) First antennal joint much the longest; 4th	RHACHICERUS, Walk,
	posterior cell open	Desmonyia, Brun.,
	Third antennal joint more than double as long as 1st and 2nd together, 4th posterior	[nov., p. 108.
_	cell closed	PARARTHROPEAS, gen.
ō.	Third antennal joint kidney-shaped, arista dorsal, subdorsal, or apical.	G.
	Third antennal joint round, oval, or pointed;	·
u	arista always apical	9
u.	Arista apical, palpi wholly bare, much en- larged, spatulate	[p. 122. MACRILOPALPUS, Big.,
	Arista dorsal or subdorsal; palpi slender,	, ,,
	always pubescent, generally bisinuate, more conical and pointed than in <i>Leptis</i> and	
_	Chrysopilus	7.
7.	Eyes in d separated by about the width of the ocellar tubercle, or actually continuous	
	for a short distance; in 2 the frons three	
	times as wide as the ocellar tubercle	8,

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Eyes in 3 contiguous for a considerable distance, from in 2 only as broad as ocellar tubercle

8. From and side-margins of face (3 2) distinctly hairy

From in 3 and side-margins of face (3 2) bare

9. Anal cell open; hind tibis with two spurs. Anal cell closed, hind tibis with one spur only

Chrysopillus, Macq,

# Subfamily XYLOPHAGINÆ.

Face flat, no socketed epistome margined by broad side-cheeks. Palpi long, curved upwards; the 3rd antennal joint flagelliform, generally divided by annulations into seven parts, but in Rhachicerus into many more Eyes in & distinctly separated, in \( \Omega \) rather wider apart. Body and legs almost bare. Scutellum smaller and metanotum more conspicuous than in normal Lep-Abdomen considerably elongated or cylindrical; the male genitalia rather complex, those of the 2 long and telescopic. All tibiæ spuired. Wings with auxiliary and 1st veins long, 2nd shorter than in LEPTINE, 3rd with fork rather short, widely open, lower branch ending above or at wing-tip, anterior cross-vein very short, situated towards base of discal cell; posterior crossvein exceedingly short or absent, anal cell normally closed at wingborder, axillary vein indistinct or absent; alule absent.

Life-history "Larva amplipmentic, allied to those of CENOMYINE and LEPTINE, carnivorous; living under the bark of dead trees and preying upon other (probably dead) larve occurring there, especially those of wood-boring Coleoptera, or upon the debris and detritus left by those larve "(Verrall). Birch, alder, and pine are the trees mostly favoured The images are usually

found about their breeding-places in woods.

Only one genus of this subfamily (Rhachicerus) occurs in India. Xylophagus, Xylomyia, and one or two other genera were for many years regarded as a separate family, but the resemblance between them is more apparent than real; and Osten-Sacken, who very closely criticised Brauer's paper on the characters of the Notagantha (Berl ent. Zeit. xxvi, p. 363), showed satisfactorily that they (Xylophagus and Xylomyia) cannot both come in the same ultimate subdivision.

### Genus RHACHICERUS, Walk.

Rhachcerus, Walker, List Dipt. Brit Mus v, Supp. 1, p. 103 (1854).

<sup>9</sup> Rhyphomorpha, Walker, Proc. Linn Soc Lond. v, p. 275 (1861).

Antidorion, Snellen v Vollenhoven, Versl. Meded Kongl. Akad.
van Wetensch. Afd Natuurk. xv, p. 1 (1863).

GENOTYPE, Rhachicerus fulvicollis, Walk.; the original species.

"Body slender, nearly linear, cylindrical. Head transverse, nearly as broad as thorax, vertex narrow. Eyes large, with small

facets, deeply notched and including a smooth space on each side by the base of the antennæ. Ocelli approximate Proboscis not prominent, palpi short. Antennæ with 34 or 35 joints, tapering slightly, much more than half the length of the body, deeply serrated on each side, joints transverse, very short, cyathiform, petiolated Thorax elongate-quadrate, abdomen pubescent, 8-segmented, hardly tapering from base to tip, about twice as long as thorax. Legs rather slender, moderately long, hind tibiæ with very minute spurs, ungues and onychia very small Wings narrow"

Range North and Central America, Culm, India, Malay Archipelago, and one species in Europe.

Life-history unknown.

### Tuble of Species.

#### 68. Rhachicerus bicolor, Brun.

Rhachicer us bicolor, Brunetti, Rec. Ind. Mus. vii, p. 461 (1912)

Head with from nearly one-third width of head, shining black, bare; three small yellow ocelli at vertex; eyes blackish. bare, proboscis bright yellow, palpi of similar colour, very small, a whitish triangular spot on each side between the eyes and the base of the antennæ. Antennal 1st and 2nd joints black, 2nd with a circlet of black and yellow bristles around its tip; flagellar 1st joint much wider than the rest, which are blacksh brown, the comb-like prolongations on the underside bright yellow. (The untennæ being incomplete, the exact number of joints cannot be given ) Thorax and scutellin wholly shining black, practically bare, humen conspicuous, bright yellow Abdomen black, dorsum of first three segments mainly yellow, the borders being black, the 4th segment being more or less yellow in the centre; venter principally yellow on the first three segments, remainder blackish. Leys bright yellow, hind coxe black. Wings with venation as in Xylomyua, grey, with a hardly perceptible darkening from the costa partly across the wing, and again towards the tip; halferes bright yellow.

Length,  $8^1$  mm.

Described from one Q in good condition in my collection from Kandy, v. 1909 (E. E. Green).

# 69 Rhachicerus nigricornis, sp. nov. (Pl. II, fig. 1.)

of Head black; from at vertex less than one-fourth width of head, widening to one-third at level of antennæ, with some whitish dust around bise of antennæ; scape of latter yellow, with short black bristles, flagellum black for 23 joints, with the comb-

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like prolongation of each yellowish white, last seven joints (making with scape 32 in all) with their comb wholly yellowish white, proboscis orange-yellow. Thoraw and abdomen orange, a large black spot on pleura in front of wing-base and another just behind wing-base, sternopleura shining black, abdomen with 2nd segment much the longest; hind border of each narrowly black, less distinctly so on 5th and 6th segments. Legs orange-yellow; hind coxe shining black, hind femora and tibue with basal two-thirds of each black; hind tarsi all black. Wings grey, subcostal and marginal cells blackish, halteres yellow.

Length, 9 mm.

Described from a unique of in the Indian Museum from Peshoke Spur, Darjiling, 2000 ft., vi. 1916 (L. C. Hartless).

### 70. Rhachicerus unicinctus, sp. nov (Pl. II, fig 2.)

2. Head with from brilliantly shining black, longitudinally furrowed, at vertex one-third of head, slightly wider just above level of antennæ; face dull black seen from below, but at least upper part brilliantly white seen from above, narrowing towards mouth; proboscis short, thick, bulbous, orange, as are the upturned cylindrical palpi, slightly thickening towards tips; eyes brown, occiput moderately shining black, with a little short brown pubescence towards margins. First two joints of antennie blackish above, orange below; 3rd with upper side and tips of rays black, the intermediate part of rays orange-vellow, 20 or 21 joints present in flagellum, according to whether the small terminal prolongation is part of the last rayed joint or not; the flattened irregularly-shaped elevation on which the antenna are placed lemon-vellow Thorax shining black, dorsum finely punctate, with extremely short yellowish pubescence; humeri and mesopleuræ dull shimug yellowish; soutellum like thoracic Abdomen slightly shining black, lst segment very short, 2nd longest, with a yellowish transverse band of moderate width, of which the hind border lies just in front of middle of segment and is punctuated by a row of small indentations, almost giving the appearance of two segments, 3rd and 4th segments barely narrower than 2nd; 5th rapidly narrowing from base to tip: 6th, 7th, and 8th extremely narrow and very elongate, having a telescopic appearance, the last one possibly forming two segments (making nine in all) in addition to the two pale yellow elongate lamellæ; whole abdomen with sparse short yellowish-white pubescence, venter black, 2nd segment mainly dull yellowish. Legs mainly orange-yellow; trochanters, about basal half of femora, and hind tibise wholly black Wings vellowish grey, vitreous, stigmatic region a little yellowish brown, a slight infuscation at wing-tip, halteres yellowish.

Length, 8 mm.

Described from one 2 in the Indian Museum from Peshoke, Darjiling, 1000 ft, 26, v,-14, vi. 1916 (Gravely).

# Subfamily ARTHROCERATINÆ.

Anteunæ obviously elongate, 3rd joint flagelliform, with distinct annulations, arista absent. Front tibie without apical spurs

Only two genera occur in India, and they may be distinguished as follows —

First autennal joint as long as 2nd and 3rd together, 4th posterior cell open.
Third antennal joint much more than double as long as 2nd and 3rd together, 4th posterior cell closed.

DESMONYIA, Brun.

[gen nov. Parathrophas,

### Genus DESMOMYIA, Brun.

Desmonyra, Brunetti, Rec Ind. Mus. vii, p. 462 (1912).

GENOTYPE, Desmonyra thereviforms, Brun., the original species.

Apparently near, but quite distinct in several characters from Arthroceras\* Five posterior cells, 4th without any trace of contraction towards wing-border; anal cell closed just before wing-border, remainder of venation in accordance with Williston's figure of the wing of Arthroceras.† Antennæ elongate, 1st joint as long as 2nd and 3rd together, cylindrical, 2nd broadly annular, 3rd elongate with an apical style-like prolongation. Eyes contiguous for a considerable distance, bare, three ocells Probocus rather short, stout, cylindrical, palpi elongate, narrow. Face with two dividing turrows below antennæ and rather bulbous cheeks, as in Arthroceras. General appearance of whole insect that of a Thereva, with soft pubescence on thorax and abdomen, the latter with seven distinct segments. Legs slender, like those of Thereva, fore tibiæ unarmed, posterior tibiæ with two distinct pale spurs each.

# 71. Desmonyia thereviformis, Brun.

Desmonyia thereviformis, Brunetti, Rec. Ind. Mus. vii, p. 402 (1912).

d. Head with vertex small, dark; occiput of a lighter grey than the dark blackish-grey face; proboscis and palpi blackish grey; the whole head with stiff black hairs; eyes bare. Antenna dark grey, 1st joint elongate, cylindrical, 2nd broadly annular, half the length of the 1st; the 3rd joint is best described as diamond-shaped, with rounded angles, the greatest breadth being beyond the middle; the tip produced into an elongate narrow style with blunted tip, the style as long as the whole antenna. Thorair dark grey above, with three separated, moderately broad, blackish stripes, the outer ones with a tendency to an interruption in front of the middle, sides and scutellum moderately dark grey,

<sup>\*</sup> The description of this genus is not accessible in India. | 'North-American Diptera' (3rd ed.), p. 161, fig. 18,

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with soft pale yellowish-white pubescence Abdomen 7-segmented, 2nd the broadest, dark blackish grey with soft pale yellowishwhite pubescence, genitalia small, inconspicuous. Legs black, knees and femora more or less brownish yellow at base, the colour on the fore pair extending beyond the middle; hind tibut widened towards tips, hind metatarsus distinctly increasate; the whole of the legs shortly pubescent, anterior tibin unarmed, posterior tibiæ with two distinct yellowish spines Wings as in Leptis, except that the anal cell is closed just before the border, pale grey; stigma blackish, very elongate; two indistinct pale blackish suffusions, the first, from the origin of the 2nd vein, embracing the anterior cross-vein, the base of the discal cell, and the posterior cross-vein; the second runs from the fork of the 3rd vein to the hinder side of the discal cell, along its outer side, costal cell rather broad, the costa curving outwards slightly; halteres brownish vellow.

Length, 5-6 mm.

Described from two of of in the Indian Museum from Badrinath, Garhwal District, 10,200 ft., 27. v. 1910 (Dr. A. D. Inms).

#### Genus PARARTHROPEAS, nov.

GENOTYPE, Pararthropeas thereviformis, sp. nov

Head transverse, as broad as thorax; eyes bare, with voly small facets of uniform size (2), probosers rather short, thick, pulpi as long as proboses, cylindrical, straight, bare, porrect; froms narrow, with parallel sides, face broader, with nearly parallel sides, not projecting beyond eye-maigins; occiput flattened, or slightly concave, antenne longer than breadth of head, cylindrical, barely appreciably narrower towards tip, 1st and 2nd joints short, bristly, 2nd shorter than 1st, as broad as long, 3rd divided by eight impressed lines into nine annulations of equal length, except the 1st, which is considerably the longest, last joint bluntly pointed, without style. Thorax oblong, humori prominent, nearly bare, with no obvious bristles, minutely pubescent; scutellum transverse, unarmed. Abdomen subcylindrical, about twice as long as thorax, slightly flattened, with nearly parallel sides for some distance, gradually narrowing to tip, 7-segmented, the last segment very short. Legs of moderate size and strength: hind femora considerably incressate, with a row of small blunt spines on underside; posterior tibiæ with two spurs, front tibiæ apparently unarmed, tarsi as long as tibie, front pair distinctly longer; claws distinct, three pulvilli. Wings with auxiliary vein ending at about middle of costa, 1st longitudinal ending a little beyond, 2nd vein beginning at about middle of wing, ending a little beyond 1st veiu; 3rd vein beginning shortly after 2nd. forked at half its length, the branches gradually diverging, the lower branch ending at wing-tip, anterior cross-vein near base of discal cell, which is twice as long as broad; 5 posterior cells, 1st gradually widening from base to tip, 2nd and 3rd truncate at

base, 4th closed distinctly before wing-margin, posterior cross-vein present; anal cell closed.

d unknown. Range. Assam.

This genus differs from Arthropeas, Lw., by (1) the 1st flagellar joint not being differentiated from the others, except that it is longer, and the whole antennæ being practically cylindrical throughout instead of gradually narrowing to tip; (2) the abdomen being much narrower and longer relatively to the thorax; (3) the 4th posterior cell being distinctly closed before the border, and (4) the hind femora being distinctly incrassated and bearing a row of small blunt spines on the underside.

Williston, in his table of genera of North-American Leptide, emphasizes the absence of contact of the 5th posterior cell with the discal cell, but in Loew's figure of the genotype such contact is only punctiform. These cells may be more separated in the other two North-American species, they are distinctly apart in Pararthropeas.

### 72. Pararthropeas thereviformis, sp. nov (Pl. II, figs. 5, 6.)

Q. Head as broad as thorax; eyes bare, black, facets small, of uniform size; from about one-seventh of the head, almost flush with eyes, blackish, with short pale pubescence, which is a little thicker just above antennæ; face not projecting beyond eyes, flattened, with nearly parallel sides, dark grey, practically bare; occidut blackish, bare, except for some short whitish pubescence behind lower margin of eyes. Proboscis short, thick, not projecting beyond base of antenno, brown, bearing a few hairs; palpi as long as proboscis, bare, brownish yellow Antennæ longer than breadth of head, cylindrical, 1st and 2nd joints black, bristly, 2nd shorter than 1st, as broad as long, 3rd bare, divided by seven impressed lines into eight annulations, of which the 1st is the longest, tip bluntly pointed; 3rd joint black, except the brownish-yellow 1st annulation and base of 2nd. Thorax oblong, dorsum black, rather flattened, with microscopic, depressed, greyish pubescence, which is a little more obvious in front of the scutellum, the latter black, with centre and hind margin yellowish, sparsely and shortly pubescent, humori prominent, yellowish brown; pleure black, with very short grey pubescence. Abdomen subcylindrical, nearly Phycus-like, 7-segmented, the first six subequal, the last very short, black, with minute grey pubescence, hind margins of segments yellow; genitalia ending in two small cylindrical yellowish pieces, which are all that is externally Legs Therevid-like, comparatively stout and strong; coxe visible black, with minute grey pubescence; fore femora brownish yellow, with upper side and distal half of lower sides black; middle pair black, except narrowly at base and tips; hind pair black, with a broad yellow band just before middle, tibe black, except that anterior pairs are very narrowly brownish yellow at base and tips ; front tarsi distinctly longer than tibiæ, posterior pairs subequal to

tibiæ; all tarsi black, with reddish-brown pubescence on underside of hind pair; all legs with minute grey pubescence, two obvious spines on middle and hind tibiæ, and it is just possible that a small one may be present on fore pair just before the slightly narrowed tips, though apparently it is absent. Wings pale grey, veins dark brown; halteres brownish yellow.

Length, 10 mm.

Described from a perfect unique ♀ in the Pusa collection from Khasi Hills, 1000-3000 ft., ii 1907

Type sent to British Museum

# Subfamily CCENOMYINÆ.

Head: antennal 3rd joint flagelliform and annulated, with styliform tip and no arists. Palpi long, thin, pointed, porrect, 2-jointed. Eyes hairy or bare, contiguous in 3 Thoras and abdomen robust, shortly pubescent or bare, meso- and metapleura with tufts of pubescence, scutellium with two short blunt spines or unarmed; genitalia small Legs comparatively short and strong; tore tibia with one spur, posterior tibia with two spurs. Basal wing-cells long, discal cell present; two submarginal cells, the 2nd long, with bell-mouthed tip, five posterior cells, 5th in broad contact with discal cell.

The CENOMYINE and XYLOPHAGINE are easily recognised by the annulated 3rd antennal joint, and the latter are distinguishable from the former by the four characters previously given in the

table of genera of LEPTIDE

Only a few genera and species of Commyine are known

throughout the world.

Life-history That of Conomyu ferruginea, Scop, a widely distributed European and North-American species, is known. The larva is amphipmenstic, cylindrical, 12-segmented, the head conical, brown, chitinized, the rest of the body with chitinized spots and bands. Pupa tree The species breeds in decaying poplars and at the roots of trees, especially beeches; the larvo are carnivorous and voracious; their total development may last over a year

The adult insects are rather sluggish, frequenting woods.

## Genus CENOMYIODES, gen. nov

GENOTIPE, Commyrodes edwards, sp. nov., the only species known.

Head comparatively small, narrower than thomax, placed somewhat low down, occiput flattened, epistoma separated from cheeks by an impressed line; eyes harry, separated by moderately broad from in \$\Phi\$ (\$\delta\$ unknown), antennæ 3-jointed, the 3rd flagellate, with eight annulations, ending in stylate form, arista absent; palpi long, thin, labella broad, proboscis rather short.

Thorax bread, robust; abdomen similar, rather longer, pointed, both shortly pubescent or nearly bare, scutellum with two blunt apical spines, genitalia small Legs as noted previously. Wings as noted above, in rest covering abdomen, posterior cross-vein absent, alulm well developed, alar squama small, thoracic squama veiy narrow

d unknown. Range. Assam.

This genus differs from Canonyia, Latr., by the broad from in the Q, by the anal cell being closed distinctly before the wingmargin, and by the 4th posterior cell also being closed at some distance from the margin, rounded apically, and sending no veinlet to the margin.

### 7.3 Conomyrodes edwards, sp. nov. (Pl. II, figs 3, 4.)

Q. Head chrome-yellow, a little darker on frons, which bears a transverse streak just above antennæ, not quite reaching eyemargins, ocellar triangle black, also a stripe from it passing over vertex and part of occiput, mouth-opening pale yellowish, head bare, except for some hardly visible pale hairs on occiput, about the eye-margins Antenna with 1st and 2nd joints yellow, with some very short black bristles, giving the joints a partly blackish appearance, 3rd joint divided by impressed lines into eight annulations, brownish yellow, with a black streak on upper side. Thorax mainly chrome-yellow, although the yellow and black parts are about equal in extent; a broad black median stripe from anterior margin, where it is slightly dilated, to hind margin, narrowing should after passing the suture, a black stripe on each side of the median one, leaving a narrow intermediate space, extending forwards barely to the humeri, and narrowing gradually behind the suture but reaching hind margin, on which all three stripes are joined, sides of thorax yellow, underside black, with a broad black stripe running from just behind the fore coxe, curving forwards, narrowing to a point a little below the humerus. a similar stripe joins the underside of the thorax with the wingbase, spreading out hindwards to the hind coxe and upwards narrowly to the scutellum, which latter is yellow, the metanotum being black, dorsum covered with microscopic yellow pubescence, with a little on parts of the pleure. . 1bdomen with first four segments bright chrome-yellow, with a fairly wide black dorsal stripe with irregular edges, dilated on hind borders of 1st and 2nd segments, occupying two-thirds of the width of 3rd and 4th segments, rest of segments reddish brown, the black dorsal stripe carried over all but the last one, dilated on hind borders; 8th segment canary-yellow on apical half; a small curved yellow mark towards each side of 6th segment; a small indistinct yellow spot on 7th segment on each side of the middle, venter reddish brown, a small yellow mark extending over 6th and 7th segments, gentalia yellowish brown, with two rather short

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projecting lamellæ Legs practically bare, bright chrome-yellow, middle coxæ obscured, a short blackish-brown strenk at tip of hind side of middle femora; hind legs with tip of coxæ, extreme base of femora, and a broad apical band on femora and tibiæ black. Wings yellow, veins brownish black, halteres bright yellow.

Length, 20 min.

Described from a single 2 in the British Museum from the Khasi Hills, Assam.

### Subfamily LEPTINÆ.

Face with a rounded socketed epistoma, eyes bare, generally contiguous in the &, facets of uniform size, prohosois often swollen, conspicuous, though never very long, palpi distinct, moderately long, porrect, or pendant. Antenno with 3rd joint simple, rounded, oval, or reinform, always with a long apical, subapical, or subdorsal arista. Abdomen elongate-conical, genitalia of moderate size. Legs slender; tibis with nows of minute bristles, middle pair with two spurs at tip, hind tibis with one or two spurs.\* Alule well developed, alar squame of moderate size, thoracic pair absent.

The genera have already been tabulated on p 103.

### Genus ATRICHOPS, Verr.

Atrichops, Verrall, Brit Flies, v, p. 291 (1909)

GENOTYPE, Atheric crassipes, Mg. (Europe), by original designation.

Head semicircular, a little narrower than thorax, more rounded and less tilted forwards than in Atherw, face with a quite bare, rounded, socketed epistoma; cheeks large, bare in both sexes; from in 3 nearly or quite bare, slightly narrowing from vertex to antenne, in 2 with a little spaise pubescence; occupit prominent, especially on lower part in 3, eyes bare in both sexes, contiguous or practically so in 3, facets uniform in size; the eyes in 2 separated distinctly. Proboscis prominent, thick, with long oval labella, palpi two-jointed, prominent, slightly drooping. Antenne rather short, the space above their base bare; 1st joint cup-shaped, 2nd more or less rounded, rather short, both bristly; 3rd kidney-shaped, with a dorsal arista † Thorax slightly arched, with close short pubescence, pleure partly pubescent; soutellum

\* The apparent disagreement here with Verrall, who states that two apurs are found on all the posterior tibiæ, is due to his ranking Chrysophia as a separate subfamily, in which genus the hind tibia necessary only a single cause

4

separate subfamily, in which genus the hind tibes possess only a single spur.

† Verrall speaks of it as "terminal, which from the shape of the 3rd joint (despened downwards) appears to be dorsal." This author regards the tip of the 3rd joint as its furthest point in a straight line, in which case the arista is terminal, but I sin regarding its tip as the extremity of its greatest length, in which case the arista is dorsal.

normally also pubescent, metanotum mainly concealed, with bare sides. Abdomen oblong, narrower than thorax and barely double as long, male genitalia prominent, in 2 the tip of the abdomen pointed. Legs with front pair, and especially front tarsi, longer and thinner than in Leptis, front tibix shorter than, middle pair equal to, and hind tibiæ rather longer than, the corresponding tars, front coxe rather long; front tibie unspurred, middle tibiæ with two spurs, of which the front one is considerably the longer, hind tibie with two nearly equal spurs; the "touch hairs" beneath the front tarsi obvious Wings with the auxiliary, 1st and 2nd longitudinal veins ending at or a little beyond middle: 2nd starting well before the discal cell; 3rd beginning opposite base of discal cell, torked at a more or less acute angle rather soon after quitting anterior cross-vein, the branches gradually diverging and embracing the wing-tip; discalcell elongate; upper branch of 4th longitudinal vein torked at tip of discal cell; lower branch simple; posterior cross-vein proximad of anterior crossvein; 5th vein forked just before posterior cross-vein, the branches separating widely, lower branch always curved downwards, meeting 6th vein at or just before wing-border, closing anal cell.

Range. Europe, India. Life-history unknown.

The genus Atrichops was unfortunately wholly overlooked by me in describing the species herein referred to it, which were placed in Atherica at the time of description. Atrichops is quite well founded, the species having the cheeks distinctly bare. Set up by Verrall for Atherica crassipes, Mg, a European species, I know of no others belonging to it except those I have myself recorded from the East.

# Table of Species.

1. Abdomen with distinct reddish or yellow markings. Abdomen practically all black, at most a bluish-grey band at base or 1st segment pale yellow 5. 2. Hind femora without distinct band near IInd femora brownish yellow, with a 3. broad brown band before the tip... .. 3. Basal half of abdomen tawny, wings with calopa, Brun., p. 114. Abdomen mainly black, but reddish tawny towards sides at base, wings pale brown, with indistinct darker band in middle lanopyga, Brun., p. 115. 4 Sides of thorax yellowish grey posteriorly, without white stripe; middle femore black only at base and tip, hind femora black at base and tip in addition to broad median baud .. ..... limbata, O.-S., p. 115.

Sides of thorax all black, with oblique whitish stripe, middle femora with basal half black and apical balf yellow, [p. 116. intermedia, Brun, with a broad median white band 5 Hind metatarsus not thickened, apical half of wing infuscated distinctly thickened; Hind metataisus [p. 117. metatarsulis, Brun., 6. Apical half of wing without narrow pale band in the infuscated portion; 4th poscincta, Brun, p. 118 terior cell nearly closed, length, 10 mm. Apical half of wing with such a pale band, [p 119 4th posterior cell widely open, length, carulescens, Brun, 6 ա ա .

### 74. Atrichops calopa, Brun. (Pl. II, fig. 7)

Atheric calopa, Brunetti, Rec. Ind. Mus n, p. 420, pl. xii, fig. 2 (1909).

3 ♀. Head with vertex black, from blackish, with bluish grey shimmer, proboscis and palpi blackish, the latter hairy below; antennæ brownish yellow, with a trace of bluish grey dust on upper side of two basal joints; occiput blackish grey, with a thick fringe of long whitish-grey hair, which is absent on the upper part; lower facets of eye burely smuller than upper ones. Thorux dark brownish black, moderately shining; humeri shining brown; sides of thorax brown, dusted with light bluish grey; scutellum dark brown, with erect brown hairs Abdomen with first four segments mainly yellow, but dark brown on the upper side of 1st at the base, and a narrow dark brown dorsal line, with a narrow line at each side of the abdomen, these three lines extending over the four segments; posterior border of 4th segment dark brown, the colour extending forward in the centre, till it joins the dorsal stripe; remainder of abdomen dark shining brown, the posterior border of each segment bearing a little bluish grey dust; venter yellowish; the whole abdomen with moderately long hairs of similar colours to that of the respective parts on which they are placed; genitalia moderately large, dark brown, shining, with black hairs. Legs with very short black hairs; coxe dark brownish. with bluish grey shimmer, femora yellow, basal third in fore pair, basal half in middle pair, and basal two-thirds in hind pair black, tibiæ yellow, knees brown, basal half of tarsi yellow, apical half black. Wings very pale grey, apical half a little darker; discal cell three times as long as broad; no distinct stigma, a brownish irregular streak from the centre of the fore border, reaching to about halfway across the wing; halteres vellow; knobs black; tegulæ blackish with yellow edges.

Length, 8-10 mm.

Described from three & & in fairly good condition, in the Indian Museum collection. The type is from Sadiya, Assam, and the others from Tenasserim.

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### 75 Atrichops lanopyga, Brun. (Pl II, fig. 8.)

Athera lanopyga, Brunetti, Rec. Ind. Mus. 11, p. 420, pl. 111, fig. 3 (1909).

Q. Head with rather more than the upper half of frons velvetblack, remainder of frons, the vertex, and face below antenna blackish, with bluish grey reflections; antenno with two basal joints brown (third missing); eye-facets of uniform size, proboscis and palpi blackish, the latter pubescent above and below; occiput blackish grey, with a continuous fringe of short grey hair. Thorax black, with whitish grey reflections at the sides and on the humeri; scutellum black, with black hairs, posterior border brown. Abdomen mainly black; 1st segment dark brown, the colour extending as a wide dorsal stripe across the 2nd, sides of first two segments occupied by a large, light yellow, translucid spot; 3rd segment velvet-black, with a bicoloured spot at the sides of the posterior border, the anterior half of this spot being orange and the posterior half grey, the orange-colour extending along the sides of the abdomen in a streak, until it reaches the large translucent side-spots in front of it; remaining segments black, whitish grey posteriorly, the sides of 6th and 7th being light orange-brown; anal process black, dorsum of abdomen with vellowish hair, which at the tip becomes brown, venter yellow, with soft yellow hair, the middle segments with some irregular black marks. Legs . coxe brown, with bluish white shimmer, and silky white hair, femora yellow, base of fore pair and basal halt of middle and hind pairs light brown; tibim brownish yellow, hind pair darker; tarsi brownish black, the femora have a little pale yellow hair, which is brown on the tibie, bright golden brown on hind pair, and black on the tarsi. Wings pale grey, with a faint brown streak from the elongated brown stigma reaching nearly to the posterior border; a small elongated clear spot in the middle of the discal and of the fifth posterior cells; discal cell 34 times as long as broad, halteres yellow, knobs black; tegulæ pale yellow, transparent.

Length, 10 mm.

Described from one of in good condition in the Indian Museum collection from Sadiya, Assam.

# 76 Atrichops ? limbata, O.-S. (Pl. 11, fig. 10.)

Ather w limbata, Osten-Sacken, Berl ent Zeits. xvvi, p. 100 (1882); Brunetti, Rec. Ind. Mus. ii, p. 418, pl. xii, fig. 4 (1909).

Q. Head. vertex cinereous grey, with a few blackish hairs, upper half of frons dull coal-black, lower part bluish grey with (seen from above) a central small black spot, lower part of face blackish grey, proboscis brown; autennæ blackish grey with a few hairs at base, 3rd joint tawny, arista long; eyes blackish; occiput bluish grey, with a fringe of light hairs, which are longest

behind the sides of the eyes, palpi black, hairy below. Thorax æneous black above, the colour not attaining anterior margin except as a wide stripe in the centre, but extending to both wings and to the scutellum; humeral calli tawny, with a whitishgrey tomentose spot, contiguous to each, on the anterior border: a bluish grey spot in front of each wing, placed almost on the dorsum; sides of thorax yellowish grey posteriorly, mesopleura bluish grey; scutellum yellow, base blackish, inetanotum blackish grey. Abdomen brownish yellow, with a black dorsal stripe on first three segments, which spreads out over the greater part of the 4th and 5th segments, tip of abdomen yellow, sides with a blackish line and a tringe of black hairs mixed with some palor ones, venter yellowish, some short pale hairs over the dorsal surface of the abdomen Legs. fore come yellowish with bluishgrey reflections, posterior coxe blackish, all of them black at the junction with the femora, which are yellow, with the tips narrowly black, the middle pair having a very small black streak on the underside near the base, and the hind pair a wide black ring in the middle, remainder of legs black, but middle tibes dark brownish yellow. Wings pale grey, rather strongly indescent, with a rather dark brown middle stripe from the centre of the costa, narrowing posteriorly and reaching hind margin of wing at tip of anal cell, distal part of wing dark grey down to the fifth posterior cell, the centre of which is pale grey (reaching to the border), but a rather wide pale grey space remains between the dark brown stripe and the distal dark grey part, this clearer part ceasing at the fifth posterior cell; fifth longitudinal vem dark brown suffused; upper transverse vein placed just before onethird of the discal cell, halteres yellowish, knob black.

Length, 8 mm.

I describe under the above specific name a 2 specimen (now in the Indian Museum collection) captured from the base of the Dawna Hills, Amherst District, Lower Burma, 1. in. 1908 (Annuadale), which I at first thought was a new species. It differs from limbata, O-S, by the presence of the clearer space in the dark distal part of the wing and by the hind femoial band being in the middle, not near the tip, other minor differences hardly being specific. My augmented description may enable others to identify it definitely either as limbata or as new.

# 77 Atrichops intermedia, Brun. (Pl. II, figs. 11, 12.)

Atherry intermedia, Brunetti, Rec Ind. Mus. iii, p. 211 (1909).

3. This species closely resembles both limbuta, O-S., and calopa, Brun., and takes an intermediate position between the two.

From limbata it is distinguished by an all-black thorax, with a little whitish shimmer on the humeral parts, round the edges of the dorsum, and in front of the insertion of the wings; also by an oblique whitish stripe on the sides of the thorax, which otherwise are wholly black, as is also the scutellum. The legs are

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black, the fore temora (except base and tip), the apical half of the middle femora, the middle tibio wholly, and the hind temora are yellow, but the latter bear a broad deep black band, occupying about the middle half of their length. The wing has a large, very distinct, blackish-brown stigma, whilst the cross-band on the wing is much darker. The abdomen is differently coloured, closely resembling that of calopa, except that the posterior half of the 4th and 5th segments is occupied by a whitish band, which is invisible from certain points of view; the basal half of the 5th, and the whole of the 6th, segment is black

From calopa the broad band on the hind femora easily separates it, this character being consistent in the ten specimens examined. The wing-marks also distinguish it, owing to the prominent

stigma and the much more distinct apical part.

Length, 81 mm

Described from ten & & in excellent condition taken by Dr. Annandale, 16. iv 1909, on Paresnath Hill, West Bengal, 2000 ft., on rocks at the edge of a small jungle-stream, where it was

present in large numbers, Bojiagliat, 12. vi. 1915

This is evidently a good species, the ten specimens agreeing exactly in all particulars, whilst the three examples of my calona are also consistent; limbata of Osten-Sacken, however, according to him, appears to be variable. The present species is best described as possessing the abdomen of calona with the wing of limbata, with the addition of an all-black thorax and a large black stigma.

# 78 Atrichops metatarsalis, Brun. (Pl. II, fig. 14.)

Athena metatarsulis, Brunetti, Rec Ind. Mus. 11, p. 422, pl. xii, figs 5, 6 (1909).

J. Head. vertex small, prominent, with a few bristly hairs; eyes contiguous for a moderate distance, the facets of the lower third much smaller; antenne pale yellow, with a few bristles and nearly straight arists; face bluish grey, palpi black; lower side of face with some long black hairs; occiput grey, encircled with a row of irregular bristly hairs of different lengths. Thorax rich shining brown, with a semi-livid tinge towards the sides in front; sides with bluish grey reflections; scutellum concolorous, with a row of munute black bristles on posterior border; dorsum of thorax with scattered minute black bristles \_1bdomen with 1st segment pale yellowish, with a few black hairs and bristles; remainder shining black; dorsum of 2nd with a slight pale yellowish tinge, whole abdomen with black bristly hairs; venter black, pale yellow at base, genitalia black, hairy, apparently in three pieces, moderately prominent. Legs pale brownish yellow, posterioi come shining brown, middle femora brownish except at base and tip, hind femora with distal half dark brown, hind tibio dark brown; hind metatarsi much thickened; all the legs shortly pubescent, the hairs being softer and longer below the femora and shorter and more bristly on the tibic (especially the hind pair) 118 LEPTIDÆ.

and tars. Wings clear, with three distinct broad brown bands from the costa towards the hind margin—the first beginning at the basal cross-veins, filling one-half of the basal cells and one-third of the anal cell, thence disappearing; the second is rather narrower and exactly in the middle of the wing, reaching from the costa almost to the hind border, enclosing the inner cross-vein and nearly filling the basal half of the discal cell, the third is joined on the costa to the second by the stigma, extends nearly to the tip of the wing, leaving a narrow clear maigin, and reaches the posterior border, filling the whole of the second, third, and fourth posterior cells. Stigma very dark brown, filling all the cell as far inwards to just above the origin of the third longitudinal vein, halteres rather long and prominent, pale yellow. clubs black, elongated.

Length, 5 mm.

Described from a perfect unique specimen in the Indian Museum from the Dawna Hills, 2000-3000 ft, 2-3. iii. 1908 (.1nnandale).

A very distinct species, with the appearance of a Chrysophlus.

### 79. Atrichops cincta, Brun. (Pl. II, fig. 9)

Atheriv cincta, Brunetti, Rec. Ind. Mus. 11, p 421, pl x11, fig. I (1909)

Q. Head with from dull black, bare, the part immediately above antenne with ash-grey reflections and a few hairs; vertex blackish, only slightly indented; ocelli dull red-brown, eyes brown, with a bronze reflection, facets of uniform size, occiput giey, with a fringe of short black hairs on upper half, which are replaced by longer scattered white hairs on lower half; antenno dark brown, normal, first joint hairy above only, second joint harry above and below; face below antenno ash-grey, palpi and proboscis cinereous grey, with scattered hairs, the former with some strong black hairs at tip. Thorax blackish, with traces of close cinereous grey pubescence, which in perfect examples probably covers all the dorsum and sides; with also some scattered longer hairs over the whole thorax. Scutellum blackish, with scattered yellowish grey hairs and reddish-brown posterior border carrying a fringe of black and grey hairs Abdomen shining dark blacksh brown, shoulders prominent, forming tawny-brown calli with grey hair; underside of 1st segment continued in front as a yellow scaly process extending downwards till it reaches the hind coxe; 1st and 2nd segments occupied by a pale bluish-grey transverse band, narrowly interrupted in the middle, extending over the sides to a considerable extent, and clothed with pale concolorous hair which is continued along the lower sides of the whole abdomen to the tip, dorsum clothed with short black pubescence which, beginning with the 3rd segment, extends round the sides until it meets the line of grey side-hairs; a very narrow bluish-grey border to 4th and 5th segments, the extreme edge of 5th and 6th segments being orange-brown. Legs blackish brown, minutely pubescent, apical half of all femora and the whole of the middle tibiæ reddish tawny; some whitish-grey hairs below femora, hind tibiæ shortly pubescent, with reddish-bronze reflections. Wings pale grey, apical half pale brownish; no distinct stigma, but a rather broad ill-defined brown band runs from the stigmatic portion of the costa towards the posterior border, but fades away before reaching it; discal cell three times as long as broad, anal cell closed just before the border, by a strong convergence of the veins the fourth posterior cell (termin, O.-S.) is almost closed, thus (if a stable specific character) separating this species from all other Oriental species in this genus; halteres yellowish, knobs black, rather large; tegulæ enereous grey.

Length, 10 mm.

Described from one 2 from Margherita and two 2 2 from the base of the Dawna Hills, Amherst District, Lower Burma, 1 in 1908, all in the Indian Museum (Annandale), Bojiaghat, 12. vi. 1915, Kathgodam, 16. vi. 1915.

#### 80 Atrichops cærulescens, Brun. (Pl. II, fig. 13.)

Atherix corulescens, Brunetti, Rec. Ind. Mus. vii, p. 463, pl. xxxvii, fig 3 (1912)

A Head blackish, mainly dusted with bluish grey, from, from the ocelli downwards for three-fourths of the distance to the antennæ, shining black, bare, in which colour is inset a deep dull velvet-black triangle, its base on the lower margin of the shining part: antennæ black, dusted with bluish grey, 3rd joint dull reddish yellow; mouth-parts dusted with bluish grey. Thoraw blackish, with a shining bluish-grey reflection; two not very obvious whitish dorsal stripes, and there are greyish reflections on the shoulders, posterior corners, and elsewhere, viewed in certain lights; a few soft black hairs on dorsum; sides, pleures, and scutellum concolorous, a little yellowish behind the thoracic stigma. Abdomen blackish, barely shining, with short sparse greyish pubescence, 1st segment dusted with bluish grey, 5th and 6th with light bluish-grey hind margins, venter mainly blackish. Legs black, minutely pubescent, coxe dusted with bluish grey. Wings very pule grey; across the centre a reversed triangular brown spot reaching from the costa to the hind margin, where its apex meets the tip of the closed anal cell, the colour filling most of the discal cell and crossing the tip of the upper basal cell; following the discal margin of this brown triangle (at a distance leaving a moderately wide intermediate clear band) is the proximal margin of a second large brown band, which fills thence the whole of the discal part of the wing; a brown streak in the middle of each basal cell; stigma dark brown, filling distal half of cell; halteres vellow, clubs black.

Length, 6 mm.

Described from a perfect Q in the Indian Museum from Kurseong, 5000 ft., 6. ix. 1909 (Annandale).

#### Genus ATHERIX, Mg.

Atheria, Meigen, Illig Mag ii, p 271 (1803).

Ibisia, Rondani, Dipt Ital Prod. i, p 154 (1856)

Pelechodocera, Bigot (p.p.), Ann Soc. Ent France, (2) ii, p 91 (1856)

GENOTYPE, Atherix ibis, F., by general acceptance \*

This genus differs from Atrichops, Verr, chiefly in the pubescent from and face. In A ibis, a well-known European species, both these parts bear dense long pubescence, whereas in Atrichops they are bare

Verrall, in describing Airichops, adds a number of minor characters which, though illustrative of the type-species (ci assipes, Mg.), may possibly not occur in all the species that it may be advisable to refer to the genus.

The characters therefore allotted in this work to Atrichops may be considered to apply to Atherix also

Only one species is Indian, labrata, Big.†

Range World-wide.

Life-history. It has been said that the larva has tracheal gills, whilst Brauer states that it possesses true pseudopods instead of the roughened intercalated areas generally present in this family The Q of A ibis, a European species, cluster on a bough and lay their eggs all together in a mass, dying on the cluster, the larva when hatched falling into the water.

### 81. Atherix labiata, Big.

Atherix labiata, Bigot, Bull. Soc. Zool. France, Mi, p 117 (1887); Brunetti, Rec Ind. Mus. iii, p 212 (1909).

Q. "Proboscis at least as long as height of head; labella distinctly enlarged, palpi bare, a little dilated, dark brown. Frons black, with a few black hairs, face whitish-tomentose. Thoraw and scutellum moderately shining black, the former with grey reflections, tomentose on anterior part, sides grey-tomentose. Coxe black; halteres chestnut, with tips blackish. Abdomen shortly pubescent, grey at the sides, 1st segment black at base and middle, with a half band of grey dust on each side; 2nd segment dull tawny, with a triangular basal black spot, and at the middle of each side a brownish transverse half-band; 3rd segment with a transverse reddish line in middle. Legs all black, except base of hind femora which is tinged with pale yellow. Wings nearly clear at base, posterior half brownish grey, with three

\* Coquillett adopts Rhagio diadema, F, as genotype, but Verrall successfully establishes shis as such (British Flues, v, p. 285)

<sup>†</sup> My thanks are due to Mr. Collin for the information that labiata, Big., is truly an Atherix after an examination of the type, otherwise, as all the species that have come before me belong to Atrichops, I should have been tempted to include labiata also in that genus.

broad contiguous hyaline spots; stigma oblong, brown, veins with brownish infuscation; anal cell closed before the border " (Bigot.).

Ceylon

Type in Bigot's collection \*

#### Genus SURAGINA, Walk.

Suragina, Walker, Proc Linn. Soc Lond iv, p 110 (1860)

GENOTYPE, Suragma illucens, Walk., the original species.

Q. "Body linear, moderately broad. Head almost as broad as the thorax, vertex and front of equal breadth. Proboscis porrect, compressed, a little shorter than the breadth of the head. Palpi lanceolate, contiguous to the proboscis. Antennæ very short; 3rd joint round, arists slender, bare, longer than the antennæ. Thorax a little narrower in front. Abdomen somewhat flat, less than twice the length of the thorax, obtuse at the tip. Legs bare, unarmed, rather long and slender. Wings moderately long and broad, radial vein slightly curved; forks of the cubital vein a little longer than the preceding part; 3rd externo-medial vein inclined beyond the discal areolet towards the 4th, which is straight; subanal and anal veins united close to the border, discal areolet nearly six times longer than broad, its fore side hardly angular." (Walker.)

Range. Ceylon, Celebes, Gilolo.

It is necessary to reproduce Walker's own description of this genus unaltered, since no example has been available for redescription

Osten-Sacken drew attention † to the fact that, in setting up Suragina, Walker omitted to note its close affinity to Atheria, and observes that that author had labelled as a Suragina a species which Osten-Sacken himself subsequently described as Atheria limbata (loc.cit). Yet Walker certainly knew of Atheria, a not uncommon European, even British, genus.

Karsch admits the great affinity between the two genera, but seems to have successfully differentiated them.

Only three species are known.

### S2. Suragina elegans, Karsch.

Sus agina elegans, Kaisch, Berl ent. Zeits axvii, p. 174 (1881).

of Q. Blackish blue, black-haired. Thorax with two short white longitudinal stripes, and with white tomentum at the sides. Ibdonon in of broadly red towards the sides on the 2nd to the

| Berl ent Zeits xxvi, p 101 (1882).

<sup>\*</sup> A specimen in my own collection from Maskeliya, Cevlon, taken in March is probably this species, but unfortunately the type is not available for comparison in India.

<sup>‡</sup> See table of genera, p. 104. It must be remembered that Atherix and Atrichops differ only in the heavy and bare cheeks respectively.

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5th segments, in Q only on the 2nd and 3rd, 4th and 5th segments with broad white posterior border in both sexes; venter yellowish red. Legs very long; in d wholly brownish black, in Q with base of hind femora yellowish. Wings in d pale grey, in middle clear, with a broad irregular dark brown longitudinal stripe, wings in Q clear, only the tip greyish, and the brown stripe darker. From in Q velvet-brown, with white pubescence above antennæ, occiput white-haired; tip of abdomen in d pointed and forked, in Q flat, obtuse

Length, S-8.8 mm. Ceylon (Nietner).

The foregoing is a translation of Karsch's description

### Genus MACELLOPALPUS, Bug.

Macellopalpus, Bigot, Bull. Soc Ent France, (6) vi, p. alvili (1886).

GENOTYPE, Macellopalpus flaveolus, Big., by original designation.

This genus differs from Atrichops in having a smaller 1st autennal joint, the 3rd (damaged) "apparently hardly dilated on underside" Palpi quite bare, large, and conspicuously oval on upper side, nearly straight below Eyes bare. Pulvilli very small Anal cell closed before the border.

Range India, New Guinea.

M fascipennis is distinguished from M. fulvidus by the brown streak across the wings

# 83. Macellopalpus fulvidus, Brun. (Pl. II, fig. 15.)

Macellopalpus fulvidus, Brunetti, Rec. Ind. Mus. 11, p. 424, pl. x11, fig. 8 (1909)

P Head with from parallel-sided, slightly less than one-fifth of the head in width, with a deep vertical central groove, terminating before reaching the vertex, on which the three brownishyellow ocelli are very prominent; trons just above autenia greydusted, the remainder of it shining black, quite smooth; face below antenno, and cheeks, grey-dusted, antenno brownish yellow, 3rd joint darker, with long arista; proboses light brown (tip broken off), palpi blackish brown, lighter at base; eyes black, tacets of uniform size, occiput bluish grey, with fringe of yellow hair, which behind the vertex is replaced by two or three irregular rows of stout black bristles. Thorax light brown, with sparse short hair; sides with a slight yellowish tinge; metanotum lighter; scutellum light brown. (Though in the unique type the scutellum is bare, there are traces of it having borne bristles along the posterior border, and others, to a less extent, on the dorsum.) Abdomen light brown, nearly bare; posterior borders of segments narrowly blackish, venter light brown, with a central blackish

stripe. Legs missing, except the coxe, and the femur and tibia of one hind leg, all these are uniformly light brown, the femur having a very narrow black ring at the base. Wings pale yellow, costal boider darker yellowish brown; stigma brown, distinct, halteres light brown, with a black spot on upper side of knob.

Length, 10 mm.

Described from one specimen in the Indian Museum from Sibsagar

Bigot's description of his flaveolus is very short, and would apply to the present species, but as he marked fulvidus himself as

a new species I presume it to be distinct

Some considerations on the possible synonymy of this genus with Leptipalpus, Rond., and Heliomyia, Dol, have been set forth by me.\* Of the three genera, Leptipalpus (1850) would take precedence Apart from the two species described by me, only one other is known, flaveolus, Big, from New Guinea.

### 84. Macellopalpus fascipennis, sp. nov.

P Head with from and face between one-third and onefourth the width of the head, of nearly uniform width, dusted with grevish brown, ocellar triangle slightly raised, concolorous, with a few bristles, ocelli very distinct, whitish, with black nuclei; occiput greyish brown, with short bristles on at least upper half; antenna brownsh yellow, 3rd joint black, grey-dusted, rounded, with blunt tip and a dark brown, very long arista. The bulbous epistome, rather short proboscis with large hairy labella, and large spatulate palpi all brownish yellow, latter black at tips. Thorax and soutellum wholly brownish yellow (bristles broken off). Abdonen with 1st segment brownish yellow; 2nd moderately dark brown, graduating into yellowish on posterior half, 3rd and 4th dark brown, with distinct yellowish hind margins; 5th much narrower, short; following segments still narrower, all dark brown with indistinct yellowish hind margins Dorsum with uniform, but neither conspicuous nor dense, short black pubescence, which becomes bristly towards sides at base of abdomen vellowish on basal half, blackish on posterior half, hind margins of segments pale. Legs brownish yellow, tibize very slightly darker, tips of tarsi blackish Wings vellowish grey, stigma dark brown, large, clear-cut; a narrow brownish streak from it nearly to hind margin, embracing fork of 3rd vein and outer side of discal cell, extreme wing-tip just perceptibly clouded; an indistinct suffusion over lower branch of 5th vein; halteres large, stem thick, brownish yellow, knobs brown.

Length, 5 mm (evel ovipositor).

Described from a unique female in the British Museum from the Khasi Hills, Assam. 124 LIPTIDE

#### Genus LEPTIS, F \*

Leptis, Fabricius, Syst Antl. p. 69 (1805)
Rhagio, Fabricius, Syst Entom. p 761 (1775)
Sylvicola (Sylvicola), Harris, Expos. Engl Ins p. 100 (1782).

GENOTYPE, L. scolopacea, F. (as Rhagro scolopaceus), by definite selection by Fabricius at the erection of Leptis.

Head transverse, about as broad as thorax, face very short, quadrangular, bare, socketed between the large eye-margins (or side-cheeks), the latter separated from the face itself by a deep channel, and bearing long, rather conspicuous pubescence. Proboses prominent, thick, cylindrical, short, with distinct ribbed labella; palpi 2-jointed, distinct, with bristly pubescence, rather drooping. Eyes bare, contiguous or subcontiguous in 3, facets of uniform size, or nearly so, in 2 well separated, the from with a shallow transverse suture a little above the antennæ. Antennæ short, porrect, 3rd joint short, conical or almost remiform; arista apical, rather long, fine, and upturned Thorax practically quadrangular, with rounded corners, slightly arched, pubescence on the disc short, well distributed, rather bristly, with depressed pile intermixed, pleure mainly bare, prothorax and metapleure with rather long distinct pubescence. Abdomen nearly twice as long as thorax, elongate-conical, with at least seven obvious segments, pubescence fairly abundant, often rather bristly, but never like adpressed pile, short except at the basal corners. Genitalia in δ rather prominent, knobbed, and blunt; ovipositor of Ω jointed, appearing like an 8th segment, with two pairs of ovate lamella. Legs rather long, especially the hind pair; hind femora slightly thickened, come rather long; front tibue without spurs, front tars: with "touch hairs" below. + Wings as in Atrichops, but the

\* The name Leptus is of too old standing to be changed, and Verrall thoroughly explains all questions of synonymy concerning it (Bit. Flues, v. p. 262)

v, p 262) † In a paper by Mik (Wien ent Zeit vvill, p. 230, 1899) it has been suggested that there exists an organ of touch below the front tarsi in some general of Leptid E, Tabanid E, Dolichopolidæ, Empidæ, and some groups of Acalyp-TRATA and NEW STOCERA, in the shape of several long fine hairs, curved towards the tips, which project beyond the normal short still pubescence and the rather longer, regularly arranged, stiff bristles. He has noticed that some species of Leptis, when resting on leaves, sometimes support the body on the four posterior legs and make a sweeping curved movement with the front taisi, as though brushing up minute particles from the surface, after which they appear to hold the collected matter between the tarsi, and bending down the head seem to imbibe it through the probosis. These "touch hairs" occur mainly below the front taisi, though existing to a less extent on the middle pair also, where they are not longer than the ordinary pubescence and bristles, whilst they are absent on the hind tarsi In Atherix marginata, If., a not uncommon European species, these hairs are abundant, though almost absent in A this, F, whilst in other Leptid genera, including Chrysopilus, closely allied to Leptis, they are not present. They exist, however, in Tabanus. and in this character Mik sees an additional kinship between LEFTIDA: and Verrall gives a translation of this interesting paper (Brit, Flies, TABANID F v, p 256).

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basal cells shorter, the anterior cross-vein nearer base of discal cell and anal cell open \*

Range. Apparently almost world-wide, except Africa and Australia, but one species comes from Algeria.

Life-history. The larva of Leptis has the mouth-parts well developed, and possesses two-jointed anteniae. It is "very active, and is distinguished by having the stigmatic orifice surrounded by tour quite equal, quadrangularly placed prominences, and at the other extremity of the body a blackish naked triangular plate; on the inner side of each of seven of the abdominal segments there is a band of spines" (Cambridge Nat. Hist). The larva live in the earth, feeding on cockchafers and other beetles, some, the common European L tringaria for instance, living on earthworms. Bouché has described the metamorphoses of some European species. The pupa is mummy-like, the perfect insects occur on trees and shrubs in more or less shady spots, and are generally distributed.

#### Table of Species.

Wings with obvious suffusions, species not nearly unicolorous. Length 6 mm, wings pale grey, broadly apicipennis, Brun., p. 125 darkened Length 3 mm, wings pale brown, with clearer parts discordalis, Brun , p 126 Wings clear. Nearly wholly unicolorous species, length 5 mm unicoloi, Brun., p. 126. Abdomen with distinct triangular spots on 3rd, 4th, and 5th segments, length 7-8 mm. trangulata, sp. n., p. 127.

# 85 Leptis apicipennis, Brun. (Pl. II, fig 16.)

Leptis appenpennis, Brunetti, Rec. Ind. Mus. 11, p 423, pl. x11, fig 7 (1909).

Q. Head frons and face grey-dusted, with a large, shining black, inverted heart-shaped tubercle in the middle, and extending on each side to the eyes; occlli reddish tawny, semi-transparent, situated on the extreme vertex, first antennal joint bright tawny (rest absent), proboscis shining chestnut-brown, bare, grey-dusted at sides; palpi large, tawny brown, hairy; occiput semicircular, with a weak irregular fringe of short grey hairs. Thorax brown above, moderately shining, sides dark greyish; scutellum yellowish tawny, with a very few short irregular black hairs. Abdomentawny, with scattered pale hairs, with a wide, irregular, blackish-brown dorsal band, which occupies the whole of the last two or three segments, and with a blackish irregular line on the sides

<sup>\*</sup> Rare exceptions are known (as I. finebrir, Mg., of Europe), but not amongst Oriental species.

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of the abdomen. Legs tawny yellow, fore tibiæ yellowish white; hind tibiæ rather brownish, paler towards tip; tarsi tawny brown (middle pair wanting). Wings pale grey, a moderately dark brown apical spot begins on the costa in a straight line with the tork of the third longitudinal vein, extends thence to the tip of the wing, and posteriorly until it fills half the first posterior cell, also the whole of the second posterior cell, and then, by bending slightly outwards, the greater part of the third posterior cell, a brown streak also begins at the inner cross-vein, passes over the basal part of the discal cell, passes longitudinally through the fourth posterior cell, nearly filling it, and spreading over part of the fifth posterior cell also, and on attaining the border extends each way, meeting on one side the hind part of the apical spot, and extending on the inner side towards the anal lobe of the wing, no distinct stigma; halteres tawny yellow.

Length, 6 mm.

Described from one Q in the Indian Museum from Margherita, Assam.

### 86. Leptis discoidalis, Brun.

Leptis discordalis, Brunetti, Rec. Ind. Mus. vii, p 463 (1912)

Q. Head blackish, vertex black, frons dusted with blue-grey; antennæ and proboscis moderately dark brown, palpi black; occiput bluish grey Thorax and scutellini clear shining brown, humeri, sides, and metanotium a little lighter Abdomen darker brown, with short pale pubescence, posterior margin of segments with a not very distinct blackish band; genitalia small short-cylindrical, with two small terminal lamellæ Leys pale brownish yellow, microscopically pubescent Wings pale brown discal cell, 2nd basal cell, 5th posterior cell, and all the wing posterior to these cells nearly clear, no distinct stigma, but the region along both sides of the 1st longitudinal veins blackish; hulteres dark brown

Length, 3 mm.

Described from two Q Q in the Indian Museum, Kurseong, 5000 ft., 7. vii. 1908 (type), and Darpling, 7000 ft., 7. viii. 1909 (C. Pawa).

# 87. Leptis unicolor, Brun.

Leptis unicolor, Brunetti, Rec. Ind Mus. vii, p. 404 (1912).

đ. Head with eyes contiguous for half the distance from vertex to antennæ; frons dark blackish grey, ocellar triangle small, ocelli distinct, the vertex grooved on each side of the middle, near the eye; occiput grey, posterior ocular orbit with a fringe of delicate pale yellow hairs. Antennæ yellow, tip of 3rd joint, with its arista, black; 1st and 2nd joints short, 3rd subconical Proboscis relatively small, and much more slender than in most species,

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yellow, as are the rather distinct elongate palpi, bearing black bristly hair. Thorax uniformly light brownish yellow; in certain lights small quadrate grey reflections on the shoulders, and a distinct broad whitish-grey horizontal stripe across the pleuræ Abdomen concolorous, both thorax and abdomen with very sparse short pale hairs, venter similar Legs with coxæ and femora concolorous, knees narrowly brown; tibiæ a little darker brownish yellow, becoming nearly or quite brown at the tips; tursi dark brown, legs minutely pubescent Wings uniformly pale yellowish grey. The 2nd posterior cell nairow, the sides almost parallel, anterior cross-vein before one-fourth of the discal cell; branches of 4th longitudinal vein issuing from discal cell well separated, and cell widely open, halteres light brownish yellow.

Length, 5 mm.

Described from a single perfect 3 in the Indian Museum from Darpling.

#### SS. Leptis triangulata, sp. nov.

d Head with vertical triangle small, black, shining, bare, extreme vertex with a few short, black, bristly hairs; ocelli dull reddish brown, eyes black, from, epistoma, and cheeks whitish grey, slightly shimmering, the last with pale yellow hairs, antennæ orange, 1st and 2nd joints slightly bristly, 3rd approximately conical, with long black arista; proboscis brownish yellow; palpi blackish with numerous bustles, back of head greyish, with short pubescence above and longer yellow hairs below Thorax brownish yellow, dorsum with three shining black stripes, the median one broad, beginning on anterior margin, the outer ones narrower, beginning later, their posterior ends gradually diminishing, all three stripes dying away before reaching the scutellum; sternopleura and pteropleura with a slight silvery-white shimmer in certain lights; whole thorax bare, except for a few black bristly hairs on shoulders, along the margins, and on the wholly brownishyellow scutellum Abdomen brownish yellow; a small rounded or pear-shaped black spot in middle of 2nd segment; 3rd, 4th, and 5th segments with a large triangular black spot at base, the angles not quite attaining side and hind margins; hind margin of 5th and all the 6th and 7th segments black or blackish, more or less shining; venter brownish yellow, hind margins of segments narrowly blackish brown, upper and lower surfaces of abdomen with short black pubescence, which is longer towards the sides; genitalia small, yellowish, mainly concealed. Legs brownish yellow; tips of coxe, femora, and tibie more or less towards tips, and all tars, brownish or dark brown; legs minutely black pubescent, coxe with mainly yellow hairs on basal half and longer black bristly hairs towards tip. Wings yellowish, slightly darker anteriorly; stigma indistinctly a little deeper yellow; halteres brownish yellow.

Length, 7-8 mm.

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Described from a small series of males in perfect condition collected by me in undergrowth on hillside at Darjiling, 13-18.1x. 1913.

Type in my collection, co-types in the British and Indian Museums.

#### Genus CHRYSOPILUS, Macq.

Chrysopilus, Macquart, Recueil Soc Sci Agric Lille, p 403 (1826) Chrysopila, Macquart, Suites à Buff 1. p 429 (1834). P Styrer, Scopoli, Ent Carn p 307 (1708) P Heliomyia, Doleschall, Nat Tijd Neder Ind xiv, p. 402 (1857) Leptis (pt.), auctores

GENOTYPE, Musca diadema, L., by designation of Westwood (1840).

Head with face socketed like a dimple. Palpi porrect or slightly upturned, not drooping. Eyes with upper facets much larger than lower ones, t generally sharply demarcated, and of a different colour; in life eyes often brilliant golden green. Antennæ much as in Leptis, but 3rd joint onion-shaped, rarely longer than 2nd; ansta apical, long and thin. Thoraw "with coarse golden or pulo vellow depressed pile or scales, amongst which there may be some longer, thinner, erect hairs", mesopleure, metapleure and sides of metanotum with pubescence. Abdomen shorter than in Leptis; dorsum with a considerable amount of golden pubescence as on the thorax. Lays long and thin; coxe moderately large; femora with closely applied small golden or pale yellow scales, most conspicuous behind the anterior pairs, except at the tip, and in front of the hind pair, fore tibie unspurred, middle tibie with two apical equal-sized spurs, hind tibe with a single spur; front tarsi without "touch hairs." Wings rather broader than in Leptis; venation as in that genus, except that the anal cell is always closed at or a little before the border; subcostal vein with very small bristles; alar squamæ moderate, a single row of hairs on posterior margin

Range World-wide.

Life-Instory. The larvæ live in rotten wood or vogetable mould. Beling has described the metamorphoses of several European species, which are similar to those of Leptis. The perfect insects occur in woods, meadows, and shady places. The colours fade somewhat after death and the golden pubescence is especially easily rubbed off.

† In ferragenosus the lower facets are barely perceptibly smaller than the upper ones, and by no means clearly demarcated. There is, however, some probability of this species having to be removed to a different genus.

<sup>\*</sup> C ferriginosus, Wd, a rather widely distributed Oriental species and the only one referred to Heliomyra, is somewhat aberrant in the palpi, and may require removal to a new genus or possibly to Macellopalpus. See my notes under this genus and the further notes herein referred to

# Table of Species

The A section	
<ol> <li>Wings distinctly or darkly mottled (some- what Trypeta-like), or uniformly dark</li> </ol>	
brown Wings never mottled or uniformly dark	2
brown, somewhat yellowish or (humeralis only) pale brown	6,
2. Wings more or less mottled	3
Wings uniformly dark brown	5.
3 The pale spot beyond but contiguous to the	
stigma quite clear and sharply defined, 1st	
and 2nd submarginal cells and all pos- terior cells with a well-defined clearer	
spot at tip of each, but the outlines not	[p. 131.
sharply demarcated	marmoratus, Brun.,
The pale spot adjacent to the stigma very	,,
indefinite, not sharply defined, no wing-	
border spots distinguishable from the rather	
clearer middle parts of most of the cells	4
4 Prongs of upper branch of 4th longitudinal	
vein issuing from discal cell well sepa- rated, ground-colour of hind border of	
wing of same shade as remainder of wing,	
stigms brown, rather ill-defined, length,	[p 131.
3 iim	albopictus, Brun.,
Prongs of upper branch of 4th longitudinal	-
vem assume from discal cell united or	
nearly so, hind part of wing nearly clear,	
except for the influentions along the veins,	[p 132.
stigma nearly black, more sharply defined; length, 4 mm	or natipennis, Brun.,
5. The long dark brown stigma uninter-	[p 133.
rupted	luctuosus, Brun.,
Stigma interrupted by an elongate yellow	[p 133
spot	flavopunctalus, Brun,
6 Wing with aix bluish opalescent spots, 2nd	
posterior cell much longer than 3rd . Wing without traces of opalescent spots;	opalescens, sp. n., p. 134
2nd posterior cell subsqual to 3rd, at least	
in all my species	7.
7. Mainly black species, at least the thorax	8.
Mainly yellowish or brownish species, at	
least the thorax almost always so	18.
8. Wings with a distinct suffusion in addition	
to stigma, (wings pale brown in humeralis	9.
Wings unmarked except for the stigma	13. [p. 135.
9 Wings uniformly pale brown	humeralis, Brun.,
Wing- never unformly pale brown; prac-	, ,
tically clear, with more or less distinct	
suffusions	10.
10 Wing-tip clear, a distinct brownish suffu-	F., 10×
sion from stigma to beyond middle of	[p 185.
Wing-tip always distinctly infuscated	segmentatus, Brun.,
at or wall assumeral resumment	к
	45.

rr.	wing-tip blackish from near stigma up to	
	and including 3rd posterior cell	12
	Wing-tip suffusion consisting of infuscation	[p 136.
	of both branches of 3rd vern	cochinensis, sp. n ,
12.	Second and third antennal joints and palpi	
	black, abdomen all black; wing-tip suf-	
	fusion stronger	gravely, sp n, p. 187.
	Second and third antennal joints and palpi	0 0,1 ,1
	yellow; abdomen yellowish at base, wing-	
	tip suffusion less distinct	sımılıs, sp. n, p 138.
13.	Antennæ black	14.
	Antenne yellow	16 [p 138.
14	Stigma large, dark brown, well-defined	maynipennis, Brun,
	Stigma brownish yellow, diffused or ill-	magnipennio, man,
	defined	15.
15	Femora all yellow, except the narrowly	101
10.	black base, stigma pale brownish yellow,	[p. 138.
		flavopulosus, sp n,
	Femora all yellow, except the black basal	ranopuosus, sp 11,
	balf of anterior name atoms rellevish	[m 197
	half of anterior pairs, stigma yellowish brown, suffused	[p 137.
16	Long rollogy	bu manensis, sp n
10.	Legs yellow	yerburyi, sp. n, p 139.
	We refer bush bush but of superior lemons	[p 140.
17	black	albobasalıs, Brun.,
11.	Stigma pale yellow, two shining white	marlama Sah = 140
	spois above antenno	msularis, Sch., p 140.
	Stigma conspicuous, dark, but not always	10
٠.	with well-defined limits	19
18	Wings distinctly yellow	20
	Wings grey	21
TA.	Lower eye-facets barely smaller than upper	F 3.43
	ones, tibus more or less darkened soon	[p. 141.
	after the base, length, 8-11 mm	ferruginosus, Wied,
	Lower eye-facets very much smaller than	
	upper ones, tibre practically all yellowish;	
	length, 54 mm.	unicolor, Brun., p 141.
20.	Third antennal joint black	22.
	Third antennal joint yellow	23
21.	Basal half of abdomen yellowish, except for	
	a dorsal dark stripe and dark hind margins,	
	rest of abdomen black, wings practically	
	clear, except for a small dark brown	
	stigma and faint transverse suffusion to-	
	wards tip, narrow, graceful, nearly linear	
	species; anal cell closed at some distance	
	before border	stiyma, Brun., p. 142.
	Abdomen dark shining brown, hind margins	
	of 2nd, 8id, and 4th segments broadly	
	yellow, wing distinctly grey, almost yel-	
	low-tinged, large brown stigma, broader,	
	comparatively shorter species; abdominal	
	segments after 4th suddenly contracted;	_
	anal cell closed just before border	latus, sp. n., p. 148.
22,	First antennal joint black; legs darker brown.	sordidus, sp. n., p. 143.
	Antennæ wholly yellow; legs yellow, tibiæ	
	and tarsi a little darker	alternatus, sp. n., p. 144.
		- ·-

### 89. Chrysopilus marmoratus, Brun. (Pl. II, fig. 17.)

Chrysopulus marmoratus, Brunetti, Rec. Ind Mus. ii, p. 429, pl. xii, fig. 10 (1909).

d. Head with vertex much elevated, light brown, the ocelli well separated and very distinct, semi-transparent, with black centres; eyes light chestnut-brown, upper facets rather large, lower ones very small and much darker brown; eyes contiguous almost down to the antennæ, the frons receding so much as to be invisible; the inner sides of the eyes (seen from in front), also the face below the antenne, blackish grey; antenne, proboscis, and palpi Thorax moderately dark brown, with sparse brownish vellow golden-yellow hairs on dorsum; slightly paler at sides, and with concolorous scutellum and metanotum, the former bearing some moderately long brownish hairs. Abdomen dark brown, 2nd segment and posterior border of 1st segment lighter; venter brown; whole abdomen lightly covered with brownish hairs. Legs with core light brown; the single leg of the (unique) type (fore leg) is concolorous. Wings rather dark brown, with pale grey spots, of which the clearest is an oval one just beyond the stigma, reaching from the costs to the fork of the 3rd longitudinal vein; below this follows a spot in each of the 1st, 2nd, and 3rd posterior cells, there is a small one in the centre of the discal cell, which, with a small one in the 4th posterior cell and a large one in the 5th posterior cell, form a row, a small spot is at the tip of the marginal cell, and a larger one at the tip of the submarginal; whilst the whole posterior border of the wing is pale grey, spreading out somewhat in the cells and in the axillary cell. The veinlets forming the upper fork of the 4th longitudinal vein emerge practically together from the upper corner of the discal cell, the outer side of which is practically quite straight. Halteres light brown, with large blackish-brown knobs.

Length, 4 mm.

Described from one specimen from Sadiya, Assam, in the Indian Museum.

# 90. Chrysopilus albopictus, Brun. (Pl. II, fig. 18)

Chrysopilus albonetus, Brunetti, Rec. Ind. Mus 11, p. 428, pl. xii, fig. 9 (1909).

Q Head wholly black, from about one-fourth width of head; a vertical indentation just above antenne, with slight greyish tomentum; antenne, proboscis, and palpi tawny yellow. Thorax (denuded) light tawny brown, sides sublivid, scutellum concolorous, with some longish hairs on posterior part. Abdomen dark brown, conical, posterior borders of segments lighter; venter dark brown. Legs tawny yellow, temora and coxe brighter, tarsi darker. Wings moderately dark brown, with pale grey patched that take the form of three irregular light bands, commencing at, or just below, the costa, of which the first begins just beyond the

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stigma and terminates posteriorly on reaching the fork of the 3rd longitudinal vein; the second crosses the middle of the discal cell and attains the hind border, the third crosses the second basal and the anal cell, and is merged in the light colour of the base of the wing, the centres and hind borders of the posterior cells are also pale grey. The upper fork of the 4th longitudinal vein emerges from the upper corner of the discal cell as two separate veins, the outer side of that cell forming a distinct angle. Stigma dark brown, proportionately large, and there are traces of yellow just before it and also in the basal cells, halteres brownish yellow.

Length, 3 mm.

Described from a specimen in the Indian Museum from Margherita, Assam

Walker's guttipennis must be near this species, but appears distinct, and is larger

### 91. Chrysopilus ornatipennis, Brun (Pl. II, fig 19.)

Chrysopelus ornatipennis, Brunetti, Rec Ind Mus 111, p 212 (1909).

Q. Head with from blackish grey, grooved down the centre, one-tourth of width of head, only slightly wider towards vertex, ocelli on a concolorous, slightly elevated triangle, black, with a narrow pale border and a few microscopic bristles; antenna with 1st and 2nd joints livid brown, 3rd with greyish pubescence, bristle very long; proboscis shining, livid brown at base, bright yellow on narrow part, with two very minute, dark brown, hairy lamellæ; occiput yellowish giey above, bluish grey below, with numerous minute black bristles, especially towards the vertex. Thorax yellowish brown, the dorsum covered with microscopic scales, which, seen from behind, are brilliantly emeraldgreen on the centre and bright blue towards the sides, the posterior part, and over the whole of the scutellum, in addition to the scales the entire surface of the thorax and the scutellum is covered with long curved bristly hairs, sides of thorax uniformly shining taxny yellow Abdomen brownish, becoming yellow on posterior border, covered on entire upper surface rather closely with soft black hairs, which extend round the sides and are very short on the yellow venter; they are rather thicker and longer on the fore corners of the abdomen. The 5th segment is much reduced in size, blackish grey, 6th and 7th stylate, blackish grey, with a broad distinct pale yellow posterior border, supplemented by a long thick cylindrical blackish-grey ovipositor. Leus with coxe and femora bright tawny yellow, tibe pale brown, tarsi black, coxe with some bristly hairs on and around them, hand pair with a black streak on apical boider, middle and hind tibes with two short yellow spines at extreme tip. Wings pale blackish grev, posterior part nearly clear, and light grey or nearly clear in the following places. distal ends of basal cells; middle of anal cell, a rather narrow pale yellowish band from the middle

of the fore border (adjacent to the black stigma) to the distal end of the discal cell, thence becoming pale grey, a yellowish-grey diffused spot just beyond (and contiguous to) the stigma; all the cells below the 3rd longitudinal vein are pale grey or clear in their centres. The upper branch of the 3rd vein bears a small appendix at the bend, which is rectangular; the inner cross-vein is placed at one-third of the discal cell, and the two forks of the upper branch of the 4th vein spring almost simultaneously from the upper corner of the discal cell. Halteres yellow.

Length, 4 mm.

Described from a single perfect 2 from Tenmalar in the Western Ghats, Travancore, South India, 22. xi. 1908 (Annandale), in the Indian Museum.

#### 92 Chrysopilus luctuosus, Brun.

Chrysopulus luctuosus, Brunetti, Rec Ind Mus. n, p. 430 (1909).

J. Head with vertex, from, and face blackish, antenne dark brownish yellow, proboscis and palpi blackish; occiput blackish, with rather long greyish hair at the sides and below, eyes bright brown, lower facets much smaller than upper ones. Thorax mouse-colour, nearly base; scutellum concolorous, with a row of long hairs on posterior border. Abdomen dark brown, with some yellowish-grey pubescence, venter dark brown. Legs. coxe dark brown, with brownish-grey hair, femora and tibia light brownish yellow, with sparse hair on underside of femora, and a row of minute bristly hairs on outer side of hind tibiæ; tarsi brownish yellow, tips black. Wings with anterior half rather dark brown, the colour gradually fading away posteriorly to the pale brown hand border; mediastinal cell, nearly to its tip, darker brown, no separate stigma. Upper fork of 4th longitudinal vein issuing as two separate veins from the discal cell, the outer side of which thus contains a distinct angle. Halteres pale yellow, knobs black.

Length, 5 mm.

Described from one of in the Indian Museum from Margherita, Assam.

# 93 Chrysopilus flavopunctatus, Brun.

Chrysophlus flavopunctatus, Brunetti, Rec. Ind Mus. 111, p. 213 (1909).

3. Head with vertex very small, elevated, the ocelli as in ornatipennis; facets in upper half of eyes rather larger than those in
lower hall; from deep black; face dark grey, antennæ brown,
31d joint black, bristle long, microscopically hairy; probosos
dusky yellowish brown; palpi rather robust, pale brown, hairy.
Thorax and scutellum dark brown, with microscopic hairs, which
appear bright green when seen from behind; scutellum with some
rather long black hairs; sides shining dark brown, nearly bare.
Abdomen dark brown, nearly black towards tip, with short blackish

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hairs, venter concolorous. Legs dark brown, fore coxe and fore femora wholly, posterior femora towards the tips, pale, knees black; all coxe with black hairs, hind tibue with two pale yellow spines at tip. Wings blackish brown, stigma in maiginal cell, elongated, deep black, extended to costa on the outer side of a short, bright yellow stripe which intersects it in the middle, this stripe also reaching to the costa; there is a pale parti-coloured irregular spot (yellowish and pale grey) at the distal end of the 1st basal cell, and extending below into the 2nd, posterior border of wing fading into light grey, the veins in this part being narrowly suffused with black, halteres pale yellow.

Length, 5 mm

Described from a perfect  $\sigma$  in the Indian Museum from Maddathoral, Travancore State, South India, 18 xi. 1908 (Annandale)

### 94 Chrysopilus opalescens, sp. nov.

Q. Head with from shining black (type) or dark brown and less shining; ocelli dirty pale yellow with a central black spot, tubercle dull blackish, a few short black bristles across vertex; face less shining than frons, dark, probosois similar, with hoary dust, labella large, yellow; palpi black, with a few bristles; antennæ all black, with black arista, 3rd joint shortly conical, with rather longer pubescence than usual; occiput grey-dusted, with short yellow bristly hairs and some whitish pubescence behind lower eye-margin. Tho ax and scutellum brownish yellow, pleur or a little paler, thoracic dorsum with traces of three brown stripes (type) or without them. Abdomen brownish yellow, 1st segment all yellow, or darkened in middle, 2nd, 3rd, and 4th with a broad median dark brown band, enlarged broadly across the hind margin of each, remaining segments very narrow, more or less brownish above, venter and genitalia mainly vellow. Legs vellow, tihro dark dirty yellow, tarsi darker. Wings pale yellowish, with distinct bluish opalescent spots placed as follows two transverse rows across the wings, the inner row formed by a spot in the 1st submarginal cell before forking of 3rd vein, a second in discal cell, a third in 5th posterior cell; the outer row by a spot towards end of 1st submarginal cell, one towards end of 1st posterior cell and one towards tip of 4th posterior cell, the wing-tip is occupied by another opalescent spot extending across the two submarginal cells and the 1st posterior cell, there is also a similar spot in the centre of the anal cell and another near base of costal cell, thus making nine spots in all; halteres yellowish.

Length,  $4\frac{1}{2}$ -5 mm

Described from a type and two other Q Q in the British Museum from Pundaluoya, Ceylon (E. E. Green).

Taken in the same locality by Mr Green is a d in the British Museum possessing the same two transverse rows of opalescent spots, the other spots not being obvious (the wings being slightly damaged). The thorax, scutellum, and abdomen are blackish,

except for a paleness at the sides of some of the segments of the latter. The face, antennæ, and palpi are all black, and the legs are as in the female specimens. The body may possibly have been accidentally discoloured and the specimen may be the  $\sigma$  of opalescens, as no other species known to me possesses the peculiarity of the opalescent wing-spots.

### 95. Chrysopilus humeralis, Brun

Chrysopilus humeralis, Brunetti, Rec. Ind. Mus. vii, p. 406 (1912)

d. Head with eyes practically contiguous for the greater part of their length above the antennæ, leaving a narrowly elongate from of the shape of an isosceles triangle, which is bluish grey, ocellar protuberance blackish, occiput dark grey, face narrowly triangular, bluish grey, autennæ brownish yellow, proboscis and palpi similar, the latter rather darker, both with yellow hairs. Thorax shining blackish, with pale yellow hairs, shoulders livid yellow; pleurædark bluish grey varying to blackish; scutellum and metanotum blackish. Abdomen blackish, with pale pubescence, the major part of the basal half yellowish, leaving generally a narrow anterior and posterior blackish margin of varying width to each segment, about the apical half of the abdomen all black, venter similar to upper side Legs with coxe and femora yellowish, apical half (more or less) of fore and hind femora blackish or quite black, remainder of legs dark brown. Wings grey, no stigma; a very slight brownish darkening about the fork of the 3rd longitudinal vein, continued in diminished intensity along a further or lesser part of the marginal cell; halteres yellowish, with blackish-brown knobs.

Length, 6 min.

Described from three of in the Indian Museum from Chumbi, Darjiling District, 4000 ft., vii. 1911 (Gravely).

## 96 Chrysopilus segmentatus, Brun.

Chrysopilus segmentatus, Brunetti, Rec. Ind Mus. ii, p 430, pl. xii, figs. 11, 12 (1909)

J. Head with vertex jet-black, prominent; ocelli small, equidistant, whitish, eyes very large, occupying practically the whole of the head, lower facets much smaller than upper ones; whole of face grey-dusted; autennæ tawny; proboscis large, shining brown, lower part grey-dusted; palpi dark brown, with some hair; occiput grey-dusted, studded with black hairs. Thorax dark blackish brown, with two narrow longitudinal yellowish-grey stripes on dorsum, dividing the surface into three equal parts and a silvery-grey reflection on the sides behind the wings (seen from behind), humeral calli light yellowish brown. Abdomen shining black, the segments well separated, with a telescopic appearance; posterior border of first segment shining steel-bluegrey, second wholly black; rest of segments, seen in certain

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lights, steely æneous, highly shining, with a dull jet-black, moderately wide posterior border, the whole abdomen moderately thickly clothed with soft black hairs. Legs blackish brown, base of hind femora, tips of four anterior femora, and the anterior tibue wholly, pale tawny brown. Wings pale grey, stigma brown, but ill-defined, elongated and spread over both mediastimal and subcostal cells, and from this stigmatic spot a brownish-grey band proceeds posteriorly, rapidly narrowing, and disappears on reaching the outer cross-vein, thus forming what at a short distance appears to be a brown triangular cloud, darkest in front. The lower branch of the upper fork of the 4th longitudinal vein issues from below the middle of the outer side of the discal cell, which latter has the appearance of having the upper outer corner cut off by the upper branch.

Length, 10 mm

Described from one & in the Indian Museum from Gowchar, Nepal

### 97. Chrysopilus cochinensis, sp. nov.

Q. Head with eyes separated by a very broad from occupying fully half the width of the head, the upper red-brown and lower black facets well demarcated, but of uniform size; from mainly of uniform width, except for the widening towards vertex, dark brownish yellow, with danker patches, vertex scarcely elevated, yellowish, prominent, \* from slightly but suddenly depressed just above antenne, the latter blackish, 2nd joint reddish brown, 3rd joint with a little grey pubescence, arista black; face and cheeks dusted with whitish grey, epistonia brown, covered with whitish dust, proboscis brownish yellow, palpi dark brown, bristly, occiput dark brownish yellow, with sparse short stiff black pubescence; underside of head with a little black softer hair. Thorax black, dorsum with short adpressed bright yellow scale-like pubescence, sides brownish grey, with a little yellow pubescence here and there; scutellum brownish grey, with yellow pubescence as on the thoracic dorsum. Abdomen dull blackish, barely shining, 1st segment wholly, 2nd, 3rd, and 4th segments on about basal third, with soft white pubescence; black pubescence on the remainder, the 5th, 6th, and 7th segments are suddenly narrowed, their hind borders slightly wider than elsewhere, but the broadest part of the 5th segment is barely half as wide as the 4th segment at base; ovipositor elongate, black; venter black, with a few scattered hairs. Legs blackish grey, with a little black pubescence; femora brownish yellow, tips of hind pair slightly blackish, tibic and tarsi dirty yellow, apical half of latter blackish. Wings very pale yellowish grey, almost clear:

<sup>\*</sup> In the unique type only two occili are obvious, the lower one being hidden, except for its extreme upper rim, by an apparently slight distortion of the from

stigma dark brown, elongate; both branches of 3rd vein rather broadly but lightly infuscated, an appendix at the fork, halteres yellow, basal half of clubs blackish

Length, 5½ mm.

Described from a single specimen in the Indian Museum from Parambikulam, Cochin, 16-24. ix 1914 (Gravely).

## 98 Chrysopilus birmanensis, sp. nov.

Very near *C* cochinensis, differing as follows—Head bluish ash-grey, except the centre of the trons, which is of the same shade of brown as in *C* cochinensis, 3rd antennal joint brown, the whitish pubescence rather more conspicuous; occipit with distinct whitish pubescence towards side-inargins. Scutellium wholly dead-black, like the thoracic dorsum. Pubescence of abdomen at base of 2nd, 3rd, and 4th segments more golden yellow than whitish. Basal half of anterior temora black. Wingtip without suffusion; stigma yellowish brown, more diffused, the suffusion not extending below 2nd longitudinal vein.

Described from a unique 2 in the British Museum from Gokteik Gorge, Northern Shan States, Upper Burma, 26. vii.

1900 (Col C. T. Bingham)

This is remarkably like C. cochinensis, and may possibly be a variety of it.

# 99. Chrysopilus gravelyi, sp. nov.

S. Head with vertex prominent, black, ocelli brownish; front of head and epistoma brownish grey; probosers brownish yellow; palpi daik brown, with concolorous long bristly hairs; antenno and arista blackish, occiput dark; underside of head with long pale yellow hairs. Thorax black and, with scutellum, covered with very short bright yellow adpressed scale like pubescence; hand margin of scutellum with a row of long bla k hairs. Abdomen black, covered with pubescence like the thorax, which is replaced on the base and hand part of each segment by black hairs, which latter also cover the whole dorsum of the last segment. Legs with coxe dark grey, slightly yellowish in places, with some soft bright yellow hairs towards tips; femora uniformly pale yellow; tible dirty yellow; tarsi brownish towards tips. Wings pale grey, iridescent; a darker infuscation at tip from stigma hindwards, reaching inwards sufficiently to fill the 2nd submarginal and 2nd and 3rd posterior cells, the inner outline ill-defined, and a paler space just beyond the elongate dark brown stigma; halteres yellow, knobs black

Length, 6 mm.

Described from a single of in the Indian Museum from the Daruling Himalayan Rulway, 5500 ft., 23. v. 15 (Gravely).

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## 100. Chrysopilus similis, sp. nov.

Very near C. gravelys, differing in the 2nd and 3rd antennal joints and the palpi being yellow, not black, labella bright brownish yellow, lst abdominal segment and base of 2nd yellowish; emarginations of segments yellowish brown; sides of abdomen and venter mainly so also; suffusion at wing-tip lighter and less well defined proximally.

Length, 7½ mm.

Described from a single of in the British Museum from Madulsima, Ceylon, 15. v. 1908 (T B Fletcher).

## 101. Chrysopilus magnipennis, Brun

Chrysopilus magnipennis, Biunetti, Rec. Ind Mus III, p 213 (1909).

Q. Head mainly brownish yellowish grey, a little darker here and there, especially just above the base of the antenna, ocellar triangle distinct; antennæ black, the joints subequal in length, 2nd narrowly white at tip, 3rd with grey hair, style long; palpi blackish brown, with brownish-grey dust, proboscis blackish brown, with a few hairs; underside of head with a little black Thorax (denuded) black, also at sides, traces of grey hairs and some golden-yellow hairs around base of wings and on scutellum. Abdomen black, with moderately close grey hairs, with which are intermixed some golden-yellow ones; venter with grey hairs. Legs wholly yellowish, except coxe, a very narrow ring at base of femora, and the tarsi tips, which are black. Wings practically clear; venation as in my C. segmentatus, except that the upper branch of the 3rd longitudinal vein takes towards its tip a slight downward curve, thence curving rather sharply upwards to the costa, and enclosing a well-marked, large, dark brown stigma; halteres black, club yellowish.

Length, 41 mm., wing, 61 mm

Described from a Q in my collection from Maskeliya, Ceylon (E. E. Green).

# 102 Chrysopilus flavopilosus, sp nov.

J. Head with eyes contiguous for a considerable space, upper facets dark chocolate-brown, lower ones black; ocellar triangle dark grey, bare except for a few microscopic bristles behind; frons, face, and cheeks, which are very receding, ash-grey, as is also the basal half of the proboscis, palpi brown, with yellow hairs, lower (cylindrical) part of proboscis yellowish or brownish, with a little pale pubescence; antennæ blackish, a little ash-grey about the tips of the joints, arista grey; occiput ash-grey, with some pale pubescence, lower part of head with pale yellow hairs. Thorax, with scutellum, blackish grey, wholly covered with very

short, bright golden-yellow, coarse scaly pubescence; pleuræ a little lighter grey, nearly bare, scutellium with long hairs on hind margin. Abdomen dark blackish grey (base of 1st segment sometimes lighter), dorsum wholly covered with similar yellow pubescence to that of the thorax, which appears to be sparser along the emarginations of the segments, and with some longer finer black hairs intermixed, venter lighter or darker grey, with sparse pale pubescence; genitalia dark grey, a rather large dorsal plate, a pair of 2-jointed dark grey claspers, brownish yellow towards tips. Legs pale or brownish yellow, coxe dark grey in places, with some pale yellow pubescence; tips of hind temora slightly brownish, tibiæ and tarsi yellowish, tips of tibiæ minutely black, hind tarsi blackish, darker towards tips. A high microscopic power reveals the usual adpressed yellowish scales on all the femora, so pale and closely applied to the surface as to be easily overlooked. Wings clear, stigma pale brownish yellow, elongate, distinct, but not sharply defined, halteres rather large and long, brownish yellow with blackish knobs.

Described from a & (type) from Almora, Kumaon District, 5500 ft, 29. vi. 1911 (Pava), and another & from Kuiseong,

5000 ft., 8. vn. 1908; both in the Indian Museum.

The differences between this species and the European splendidus, Mg.,\* are as follows —The coxe are yellow, the hind pair more or less blackish and bare; in splendidus the coxe are ashgrey, the hind pair bearing long yellow hairs on the apical half. In my species the femora are bright yellow, with minute yellow scales, in splendidus they are blackish, with blackish scales. In flavopilosus the palpi are thinner and shorter than in splendidus, also with fewer and shorter hairs. In flavopilosus the first two antennal joints are dark yellowish brown, in splendidus they are black.

# 103. Chrysopilus yerburyi, sp. nov.

3. Head with face and proboscis moderately dusted with dark grey, labello brownish yellow; palpi brownish yellow, black-tapped; antennal 1st joint blackish, 2nd and 3rd brownish yellow; occiliar triangle distinct; occiput grey, with a little pale hair on lower part. Thorax and scutellum black, covered with golden-yellow scaly pubescence; pleure grey; humeral region somewhat yellowish. Abdomen brownish yellow, hind margin of 2nd and 3rd segments narrowly or broadly, of 4th broadly black, remaining segments all black; the major part of each segment (except perhaps the 1st) from the base apparently covered with golden-yellow scaly pubescence and thin yellow hairs; venter yellow; genitalia black. Legs yellow, tarsi darker, tips of hind femora above

<sup>\*</sup> In my note on "? C. helvolus, Mg." (Rec. Ind. Mus. vii, p. 464) I used in error the specific name helvolus material of splendidus.

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with numerous tiny black bristles; coxe with soft golden-yellow hans. Wings pale yellowish, barely appreciably darker at tips; stigma large, dark brown, well defined; halteres yellow.

Length, 7 mm.

Described from three of an indifferent condition in the British Museum from Ceylon Hakgala, 24. v. 1891 (type) and 4 v. 1891; Trincomali Hot Wells, 17 viii. 1890 (Col Yei bury).

Two Q Q in the same collection from Pankuliam, 12. in. 1891, and Hakgala, 13. v. 1891, may represent the other sex of this species.

## 104. Chrysopilus albobasalis, sp. nov

Head with vertex very prominent, dark grey, with a few bristles behind, the brownish ocelli conspicuous, uppor eyefacets bright brown, lower ones very much smaller, dark red; antennæ yellowish, 3rd joint grey-pubescent, arista dirty yellow; froms, cheeks, and epistoma grey-dusted; proboscis brownish yellow, palpi dark brown, both with strong bristles; occiput grey-dusted, nearly bare, lower part of head with some longer pale hairs Thorax and scutellum very deep brown, velvet-like, nearly bare; pleuræ dark grey, sides of scutellum a little vellowish Abdomen with 1st segment black, hind border yellowish, with a tringe of conspicuous soft white hairs; 2nd segment and base of 3rd pale yellowish, former with some conspicuous white hairs: iest of abdomen black or dark brown, dull, with very sparse black hairs, venter coloured as dorsum, but without the white hairs Legs with coxe black, rest pale yellow; basal half of anterior femora and a ring before the tip of the hind pair, black; tips of tarsi blackish. Wings quite clear, a small dark brown well-defined stigma; halteres brownish yellow, clubs blackish.

Length, barely 5 mm.

Described from one specimen from Parambikulam, Cochin State, 1700-3200 ft., 16-24.ix.1914 (Gravely), in the Indian Museum.

The peculiar white base of the abdomen and the cutirely clear wings distinguish this species from all the others.

# 105. Chrysopilus insularis, Sch.

Chrysoprius insularis, Schiner, Reise Novara, Dipt. p. 190 (1868).

Q. Reddish yellow, the whole upper side deeper, with a pale shimmer towards sides of thorax and the emarginations of the abdominal segments; pleuræ fawn-colour, shining. Ovipositor prominent, the joints indistinct Head black; from rather broad, very shining, with two shining white spots above the antennæ; occiput dusted with whitish grey; epistoma in middle vesiculose, horn-yellow; antennæ reddish yellow, 3rd joint black, very short, quite round, arista long. Palpi approximated, porrect, reddish yellow, nearly bare, as long as the reddish-yellow proboscis. Legs ochraceous yellow, tibiæ and tarsi brown. Wings tinged with

brownish yellow, stigma honey-yellow; the two upper veins from the discal cell very approximate at their bases, the upper one a little tuined downwards, anal cell closed well before the border.

Length, 8 mm

Described originally from a single Q from Tillangchong, Nicobar Islands.

This species, which has not been seen by me, is said by Schiner to differ from *C ferruginosus*, Wied, by the absence of the brownish wing-tip and the honey-yellow stigma. The two shining white spots above the antennæ seem characteristic, otherwise the differences from Wiedemann's species appear slight.

### 106 Chrysopilus ferruginosus, Wied.

Leptis ferruginosis, Wiedemann, Zool. Mag. 1, pt 3, p. 4 (1819), 1d, Auss Zweifl 1, p 224 (1828)

Heliomyra ferruginea, Doleschall, Nat Tijd Ned Ind xiv, p 402, pl. vii, 6g 5 (1857)

Chrysophus fi ater, Brunetti, Rec. Ind. Mus. 11, p. 431 (1909)

Chrysophus ferruginosis, de Meijere, Tijd v Ent liv, p 287, pl. vxii, fig 8 (1911).

Head with vertex and from blackish or dark grey, lighter above antennæ, with black hairs on vertex, proboscis and palpi tawny, face below antenne grey; antenne brownish yellow, 3rd joint sometimes a little biownish, lower facets of eyes only slightly smaller than upper ones, not always clearly demarcated; occiput blackish, with whitish hair behind eyes scutellum light tawny brown, with minute golden-yellow impressed pubescence; sternopleura sometimes nearly livid; scutellum with pale yellow hans on hind border. Abdomen light tawny brown to deep orange, darker towards the tips, with yellowish-grey pubescence and some black hairs intermixed; posterior borders of segments (especially the hinder ones) narrowly black; venter similarly marked. Legs tawny; coxe with golden-yellow hairs; tibie and tarsi gradually becoming darker and browner up to the tips of latter. Wings yellowish grey, sometimes slightly darker towards tips; 2nd posterior cell pointed at base; outer side of discal cell quite straight; stigma dark brown, oval, distinct; costal cell yellowish; halteres yellow, knobs brown.

Length, 10-11 mm.

Described from the two specimens forming the types of my frater from Tenasserim and two ferruginosus from Batavia, x-xi 1907 (Jacobson), named by Dr. de Meijere; all four specimens in the Indian Museum.

# 107. Chrysopilus unicolor, Brun. (Pl. 11, fig. 20.)

Chrysopulus unicolor, Brunetti, Rec. Ind. Mus. ii, p. 432, pl xii, fig. 13 (1909).

3. Head with vertex very small, raised, dark brown; ocelli shung, brownsh white, semi-transparent; face grey-dusted,

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antennæ, proboscis, and palpi blight tawny brown; upper twothirds of eyes rich brown, with large facets, lower third black, with very much smaller facets. Thorax and scutellum bright tawny brown, with scattered golden-yellow hairs, and with black hairs on the scutellum Abdomen concolorous, bases of segments (except first and second) narrowly brown; the whole abdomen covered irregularly with black hairs, including a row on the posterior border of every segment, venter concolorous, with black hairs. Legs (fore pair, except coxæ, missing) uniformly bright tawny brown, practically bare, tarsi darker brown. Wings pale grei, almost clear, stigma distinct, but with ill-defined edges; a very light brownish band extending from it posteriorly, partly across the wing; veins tawny brown, halteres tawny.

Length, 5 mm

Described from one of in the Indian Museum from Margherita, Assam.

## 108 Chrysopilus stigma, Brun. (Pl. II, fig. 21)

Chrysophus stigma, Brunetti, Rec Ind. Mus. n, p 432, pl xii, fig. 14 (1909).

d. Head with vertex reduced to a very small elevated black triangle, on the angles of which are the three prominent ocelli; eyes dark reddish brown, contiguous for a considerable distance, the facets much larger for a considerable space in front above the antennæ, with a greenish-black tinge and (in certain lights) a narrow, bright green, horizontal stripe across the middle; tace much withdrawn between the eyes, light grey above and below antennæ, antennæ yellow, 3rd joint blackish, with some hans and a rather long arista, which is microscopically pubescent, proboscis cinereous grey, lower part tawny yellow; the palpi tawny vellow, with tips broadly black and hairy; a fringe of light hairs around the eyes, back of head light grey. Thorax greenish, with a dorsal narrow brown stripe in front and two small indistinct brown spots in middle of dorsum; sparse yellow hairs over the whole dorsum, sides of thorax cinereous grey, yellowish at base of wing, scutellum grey, centre with a slight greenish tinge. Abdomen yellowish, Ist segment blackish grey, segments 2, 3, and 4 with a blackish, rather wide posterior border and dorsal stripe, remainder of segments blackish, venter yellow, tip blackish; a few yellow hairs scattered over dorsum of abdomen, black hairs at tip; genitalia bi-lobed, tawny yellow, with stiff black hairs Legs with coxe and femora pale yellow, with a few yellow haus near the tip on underside of latter, and with generally distributed microscopic black hairs; tibiæ blackish yellow, with microscopic black hairs and some stronger bristles; tarsı sımılar, tips black; middle tarsı with two long spines at tip. Wings quite clear; stigma distinct, dark brown, but without well-defined limits, traces of a pale yellowish stripe towards tip of wing. Inner cross-vein placed before one-fifth of the discal

cell; anal cell closed well before wing-border; halteres yellow, knobs black

Length, 5-6 mm.

Described from a single  $\sigma$  in the Indian Museum from the base of the Dawna Hills, Lower Burma, 2 iii. 1908 (Annandals)

### 109 Chrysopilus latus, sp. nov.

Q. Head with from yellowish grey, one-fifth of the head in width just above antenna, slightly broader on upper part, the brownish ocelli on an elongate, barely elevated tubercle; frons whitish immediately above base of antennæ; antennæ blackish, 2nd joint yellowish, arista black; proboscis yellowish, with soft short pale hairs, palpi brownish yellow, pubescent; occiput grey, with short sparse bristly black hairs. Thorax yellowish brown, two narrow whitish well-separated median lines and the whitish edges of the dorsum give the appearance of three almost contiguous yellowish-brown stripes, traces of short golden-yellow pubescence towards sides and hind margins; pleuræ grey-dusted; scutellum yellowish brown, with traces of yellow pubescence. Abdomen dark chestnut-brown; 1st segment wholly, 2nd, 3rd and 4th segments with hind margins broadly and rather irregularly yellow, remaining segments much contracted, yellow, ovipositor brownish yellow, with two small terminal yellow lamella; venter similar to dorsum, both surfaces with limited short dark brown pubescence, some pale finer hairs towards sides of 1st segment. Legs with coxe brownish yellow; femora yellow, hind pair a little darker above towards tips; tibiæ dirty yellow; tarsi brown, black at tips Wings pale yellowish grey; stigma large, dark brown, not clearly outlined, halteres brownish yellow, knobs more or less darkened.

Length,  $5\frac{1}{2}$  mm.

Described from a single Q in the Indian Museum from Guindy, Madras.

# 110. Chrysopilus sordidus, sp. nov.

Q. Head with frons practically parallel-sided as far as antenne, one-tourth width of head, dusted with light grey dust; occili and occilar triangle darker; face and proboscis grey-dusted, former with soft whitish hairs near eye-margins, labella brownish yellow, palpi rather darker; antennal 1st joint blackish, 2nd and 3rd brownish yellow, arista black; occiput grey-dusted, with some whitish hairs. Thorax rather dark brown, with two well-separated narrow indistinct grey dorsal stripes and short whitish sparse pubescence; scutellium concolorous, with similar pubescence; metanotum dark brown; pleuræ moderately dark grey. Abdomen dark brown, hind margins of 1st and 2nd segments broadly, and of the remaining segments narrowly, yellowish; some whitish pubescence, more conspicuous at sides; venter dark brown, base

yellowish, hind margins of segments narrowly yellowish, genitalia yellow, with two rather exposed terminal lamellæ Legs yellowish; coxæ, femora (except base and tips), tips of hind tibiæ broudly and all tarsi (except base of middle pair) dark brown Wings grey; two slightly darker streaks over the "cross-veins", stigma large, dark brown, halteres large, dirty yellow

Length, 5 mm.

Described from a single Q in the British Museum in fair condition from Nami Tal, 7000 ft., vi 1900 (Lt.-Col. Giles).

A rather thick-set species

A 2 taken by Mr T. B. Fletcher may be this or a very closely allied species, differing in possessing distinctly longer, wholly blackish-grey antenna, no signs of yellowish margins to abdominal segments, and being wholly more grey than yellowish; Hazara District, Dungagali, 8000 tt., 21-24 v. 1915

### 111. Chrysopilus alternatus, sp nov.

d Head with the lower and hinder facets of eyes slightly smaller than front ones, but not sharply demarcated and of the same dark brown colour; vertical triangle small, blackish, ocolli inconspicuous; from and front of head grevish, antenno bright ye'low, 1st joint greyish, aiista black, epistoma blackish, proboscis and palpi bright yellow, with some soft hairs, some pule yellow hairs on inner side of head; occiput grey, with short hairs towards margin. Thorax and scutellum yellowish brown, with short, rather coarse, bright yellow pubescence; pleuro greyish. Abdomen with 1st segment and base of 2nd yellowish; of the remainder, rather more than basal half of each blackish brown, the remaining part yellowish; the whole dorsum with short pale yellow hairs; venter similar Legs vellow, tibic and tarsi very slightly but uniformly duskier Wings pale yellowish grev; stigma large, dark brown, its outline not clearly defined; halteres yellow, knobs brownish.

Length, 8 mm.

Described from a single of in the Indian Museum from Guindy, Madras; and two subsequent specimens from Coonoor, 5. ix. 1911 (Fletcher); and Lebong, 4500 it, 2-9. vi. 1909 (Howlett).

# Family NEMESTRINIDÆ \*

Head transverse, as wide as or a little narrower than thorax, set close upon it, eyes generally widely separated in both sexes, but in some cases narrowly separated or contiguous for some distance in 3 and then only narrowly separated in 2, generally bare, occasionally with dense or long pubescence, facets generally of uniform size; three occili. Proboscis varying from very long (porrect or bent down) to very short and thick, labella variable

\* This family has occasionally been called the Himmoncuride, but the claims of the title here retained have been fully established

in size; palpi 1- to 3-jointed, often indistinct. Antennæ remote at their bases, small, the two basal joints with stiff hairs, 3rd barely longer, onion-shaped or pointed, with a long bristle-like, generally 2-pointed style, which is longer than the antennæ, and sometimes pointed at tip.

Thorax approximately quadrate, humeri inconspicuous, scutel-

lum oval, variable in size, unarmed.

Abdomen comparatively short, a little longer or shorter than and about as wide as the thorax.

Legs comparatively slender, moderately long; tibiæ unspurred,

three pulvilli, slightly variable in form, claws long.

Wings of moderate size, often narrowed and elongate, always with very characteristic venation, all the veins in the distal half of the wing being practically parallel with its longitudinal axis, except the so-called "diagonal vein," and all the veins ending above the wing-tip, except the tips of two or three. This pecuhar venation gives a general resemblance to that of the MYDAIDÆ, but there is no close affinity between the two types. Auxiliary and 1st longitudinal veins long and straight, ending towards wing-tip, piæfurca very short, beginning a little before middle of wing, 2nd and 3rd veins diverging almost immediately; 2nd nearly straight, undulating, simple, but sometimes joined by an additional veinlet to upper branch of 31d vein (Fallenia, Nemestrina); 3rd vem projected diagonally and turning up suddenly before or at about half its length, shortly afterwards forked, the brauches either parallel (Nemestrina, Hirmoneura, Rhynchocephalus) or widely open, reunting to form a small subtriangular cell (Fallenia). Anterior cross-vein absent, as the 3rd and 4th veins always anastomose at that spot\* (i.e. at about two-thirds the length of the discal cell), 4th vein with upper branch forked, the two prongs parallel and ending above wing-tip; lower branch ending in (or united with) upper branch of 4th vein (just before it forks) at distal angle of discal cell; posterior cross-vein normally present (absent in Fallenia); 5th vein forked, both branches torming rather pionounced curves; upper one joining upper branch of 4th vein between its upper and lower prong, thence diverging and running for the very short remaining space to the wing-margin; lower branch of 5th vein turning down to wingmargin after quitting posterior cross-vein, sometimes meeting anal vein, closing anal cell; anal vein undulating; axillary vein short or rudimentary. First basal cell long, narrow, pointed at the tip; 2nd broader, shorter, roughly speaking three-sided, anal cell long, narrow, open or closed just before wing-margin; two submarginal and four or five posterior cells, 4th always closed. There is an apparent vein running diagonally across the wing, beginning with the prefurca and ending in the hind margin of

<sup>\*</sup> I am not quite sure about this point. Even if a short cross-vein occurs here I do not think it is the anterior cross-vein, but an entirely supernumerary vein (See notes under Lassa in Orietio E.)

the wing some distance before wing-tip. This is no real individual vein, but is composed of the pirefurca, the basal portion of the 3rd vein up to its junction with the 4th, the outer side of the discal cell (upper branch of 4th vem), the continuation of the same branch and, finally, the united ends of the lower branch of the 4th vem and upper branch of 5th vem The last two sections of this "diagonal" vein (as it is conveniently called) are occusionally joined by a very short veinlet, which may be regarded as the upper prong of the lower branch of the 4th vern. It has no parallel in any other family of Diptera Additional vehilets occur in some genera and species connected with the 3rd voin, the exact identification of which is perhaps unimportant, especially as no such cases are known amongst Oriental species In Nemestrana, a non-Oriental genus, but one which may possibly occur in India, the most characteristic venation in the family is reached, presenting a curious, somewhat dragonfly-like network of veins, owing to all the spaces between the 2nd vein and the lower prong of the upper branch of the 4th vem containing a number of transverse veinlets, dividing that part of the wing into a considerable number of small squares. A few similar additional veinlets occur between the lower branch of the 4th vem and the wing-margin

Life-history. Larva amphipmenstic, head very small, retractile; twelve body-segments, posterior spiracles terminal, well separated, placed in a transverse fissure. Of the only species of which the life-history is known, a Hirmonewa, the larva is parasitic on the early stages of the common European beetle, Rhizotrogus

solstitialis.

This family is sometimes divided into two subfamilies, (1) the NEMESTRININE, with a very long proboscis and short palpi, and (2) the HIRMONDURINE, with a very short proboscis, to which character Verrall adds "palpi very long and upturned," but this latter does not hold good. The erection of subfamilies therefore merely on the length of the proboscis does not seem advisable. In any case all the Oriental genera would fall in the Hirmmondurine.

# Table of Genera.

Ocelli absent (a	uxiliary vein very short,	
not extending	much beyond origin of	[p. 154. ATRIADOPS, Wond.
2. Palpi moderatel opening always	y long, and with mouth- s obvious (auxiliary vein as 1st vein)	[p. 147. Hirmonkura, Mg.,
Palpi, proboscis,	and mouth-parts wholly	
. Auxiliary vein u until beyond n	inited to 1st longitudinal inddle of wing.	[p. 153. Trichopsidna, Westw.,
Auxiliary vein d as long as let l	distinctly separate, nearly ongitudinal	[·. 186

#### Genus HIRMONEURA, My.

Hu moneura, Meigen, Syst. Besch 11, p. 132 (1820), Blanchard, Hist.

Nat Ins 111, p 587 (1840).

Hyp moneu a, Rondani, Aichiv. Zool Modena, 111, p. 50 (1863).

Hyrmophloba, Rondani, op. cit p 51 (1863). Hermohewa, Philippi, Verli. z -b Ges. Wien, xv, p 655 (1865) Parasymmetus, Bigot, Bull. Soc Ent France, (5) ix, p lavii (1879).

Genotype, *Hirmoneuia obscura*, Mg. (Europe); by original designation.

Whole body of about uniform width Head transverse; eyes bare or pubescent, in & contiguous, in ? wide apart, or distinctly though narrowly separated in 3, in which case they are less widely separated in Q, three ocelli Proboscis very short, hardly extended beyond mouth-opening; palpi moderately long, curved

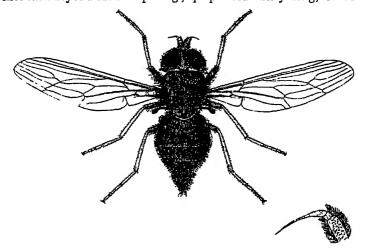


Fig 9 -Hirmoneura opaca, Light, and enlarged figure of antenna

upwards. Antennæ short, porrect, remole at base, 3-jointed, 1st and 2nd subglobular or cylindrical, subequal in length, 3rd onionshaped, longer, produced in a long arista-like style longer than Thorax subquadrate. Abdomen rather longer than thorax, the tip pointed in both sexes, more so in Q; whole body and legs devoid of any strong bristles, but bearing longer or shorter soft pubescence of varying extent. Legs moderately long, slender, minutely pubescent. Wings moderately or rather long; auxiliary, 1st, and 2nd longitudinal veins long, ending towards wing-tip; 2nd beginning about or before middle of wing, nearly straight; 3rd beginning near base of 2nd, projected diagonally across the wing, anastomosing (even if only in a punctiform manner) with 4th, thence bent suddenly upwards, shortly afterwards forking, the branches long and approximately parallel, gently curved; 4th vein forked; upper branch again forked, the branches straight, parallel with those of 3rd vein and with hind margin of wing, lower branch forming basal and lower sides of discal cell, meeting upper branch and thence turning down to the hind margin, receiving the upper branch of the 5th vein just before; 5th vein forked, posterior cross-vein technically present but very short. Two submarginal and five posterior cells, 4th always closed, a discal cell, wider at base than tip, elongate; 1st basal cell reaching nearly to tip of discal; 2nd basal long; anal cell long and narrow, open—Squamæ small.

Range. Central and South Europe, North, Central, and South America, South Africa, Central Asia, the Orient, and Australasia

Life-history This is known to some extent of H obscura, Mg., a European species, as described by Handhrsch.\* The eggs have been found in holes in the bark of silver firs, and the fully developed larva has been found in the pupa of a beetle, Rhizotrogue solstitudis. The larva resemble those of the LEFTIDE.

As regards the spelling of the generic name, Hermoneura has been suggested, but "Dr. A. W. Verrall is of opinion that Nemestrina and Hirmoneura are so impossible as Greek compounds as to be beyond correction" (G. H. Verrall).

## Table of Species.+

1.	Eyes bare Eyes pubescent ‡	2
2	Legs all yellowish, eyes narrowly sepa-	
	rate in d	annandaler, Licht., p 149
อ	contiguous in d	basalıs, Licht., p. 149.
U	Legs black (tible with thick brownish pubescence)	opaca, Licht., p. 150
đ	Legs principally yellowish	4
*	Smaller species, 11–12 mm Larger species, 16–20 mm	6.
5	Small grey species with abdominal bands	
	of pubescence	cingulata, Licht., p 151.
ß	Eyes with yellow hair	brunnea, Licht., p. 151.
	Eyes (presumably) with black or dark	
7.	brown hair	7.
	pubescence	austeni, Licht., p. 152.
	Body coffee-brown, rather bare	coffeata, Licht, p. 152.

<sup>\*</sup> Wien Ent Zeit i, p 224, and ii, p 11 (1882, 1883).

t It has been difficult to draw up a satisfactory table owing to the close affinity of all the species, and from my knowledge of most of them being limited to German descriptions. In the case of the eight species included herein, annualate, cinquitata, and basalis are redescribed from Indian Museum specimens (all seen by Lichtwardt), that author's descriptions being also incorporated. The descriptions of the remaining species are the best translations of Lichtwardt I can offer

<sup>†</sup> Presumably, no definite statement is given in the descriptions of coffcate and brunnea.

### 112. Hirmoneura annandalei, Lucht.

Hurmoneura annandalsi, Lichtwardt, Roc. Ind Mus. ix, p 333 (1913).

of ♀. Verylike H cingulata in size and colour, but separated from all other species except H. basalis by the bare eyes. Head with trons hardly narrower in 3 than 2, more than twice as wide at level of antennæ (where it forms a little more than one-fourth the width of the head) than at vertex; from with long soft black hairs, face with yellow hairs, antenne and proboscis both bright yellow, sides of face narrowly yellow. Thorax blackish, with blackish pubescence in middle of disc, yellowish and thicker on anterior margin and towards sides, on shoulders, and in front of and just below wing-base, soft yellow pubescence on sides of thorax and scutellum; metanotum pale grey. Abdomen with black anterior half and slate-grey hinder half of 1st segment; remainder of segments blackish, 1st segment with black hairs on the black part and thin pale yellowish hairs on the slate-grey part; remainder of segment with thick, long, bright yellow pubescence on anterior half and shorter black pubescence on hinder half; venter blackish, with short uniform pale yellow pubescence, hind margins of segments yellowish. Legs entirely bright yellow. Wings grey, anterior border brownish; halteres blackish brown.

Length, 11-13 mm.

Described from several of each sex in the Indian Museum from Simla, 7000 ft., 9. v 1910 and 16. v 1910 (Annandale), 3. v.1914 and 29. v 1914 (Capt. Evans), Kutti, Simla Hills, 11. v.1909 (Annandale); Kufti to Phagu, 21. v.1916; Mahabaleshwar, Satara Distr., 4200 ft., 13-16. iv. 1912 (Gravely)

This species is extremely like *H. cangulata*, but in addition to the bare eyes it may be recognised by the black hairs on the abdomen being much shorter than the yellow ones, whereas in *H cingulata* they are nearly or quite as long as the yellow ones.

In the present description of this species I have incorporated

Lichtwardt's main characters.

# 113. Hirmoneura basalıs, Licht.

Hirmonewa basalis, Lichtwardt, Deut. Ent Zeits. p. 595, fig. 3 (1910), id., Rec. Ind. Mus. ix, p. 333 (1913).

3. Head with eyes bare, closely contiguous for a considerable distance, leaving a grey from of the shape of an isosceles triangle, covered with long black pubescence; vertex reduced to the very small occilar tubercle, with a few black hairs; face blackish, with yellow margins and pale yellowish hairs; blackish hairs round base of antennæ; latter yellowish brown, basal joint with long stiff black hairs, 3rd joint onion-shaped. Thorax greyish brown, shortly pubescent at sides; on breast the hairs more greyish white; scutellum with dense yellowish-brown pubescence. Abdomen characteristically coloured; anterior half of 1st segment

black, hind half of 1st and anterior half of 2nd ivory-white, with pale yellowish-white pubescence, remaining segments cinimmonbrown, with short blackish-brown pubescence, a little yellowish or whitish pubescence at sides of abdomen from 4th segment to tip; venter reddish brown, with some short yellowish pubescence Legs anterior pairs wholly brownish yellow; hind femora brownish, hind tibue and taisi dark blackish brown. Wings pale brownish grey, darker anteriorly; venation typical, as in H. obscura, Mg

Length, 16 mm.

Described originally by Lichtwardt from a type of in his collection, which, purchased from a dealer, bore the label "Ecuador, in 1899" This author subsequently received from the Indian Museum for examination the of specimen from which the above description is drawn up—from the Dawna Hills, Burma, 2000—3000 ft., 3. ni 1908 (Annandale)

Type in Herr Inchtwardt's collection.

# 114. Hirmoneura opaca, Licht. (Pl II, fig. 22.)

Humoneur a opaca, Lichtwardt, Deut. Ent Zeits p. 643, 9 (1909); id., Rec Ind Mus ix, p. 334, 3 (1913).

3 Q. An obscure, blackish, grey-dusted species, with thin soft grey pubescence. Head with eyes dark brown, pubescent; frontal stripe in Q not at all broad, barely wider above antenno than at vertex, with thick black pubescence, which is longest above antenno; proboscis, palpi, and antenno black, 1st and 2nd joints of latter grey-dusted and with vellowish-grey hairs, similar hairs on epistoma, underside of head, and sternium. Thorax with the pubescence more yellowish and longer at the sides; entire dorsal surface with soft greyish blue heavy dust. Abdomen with a hardly discernible pattern on the middle of each segment, consisting of a central spot and two oblique lateral spots of a dull blackish-grey colour; ovipositor rather long, with pale hairs. Legs black, tibio, especially lind pair, with such dense bright brown pubescence, that they appear brown. Wings with a blackish tinge and a brownish shading on anterior border.

Length, 15 mm.

Described originally from a single  $\mathcal{P}$  from the Kangra Valley, N.W. Himalayas, 4500 ft., xi. 1899 (Dudgeon). Further notes and the  $\mathcal{E}$  described by Lichtwardt in the Rec. Ind. Mus. (l.c.). Several specimens are in the Indian Museum from Mussoorie, the Kangra Valley, 4500 ft., xi. 1899 (Dudgeon), and Simla, but are in very bad condition, nearly all appear to have been immersed in spirit; it also occurs at Dehra Dun, x. 1911 (Howlett).

Type in the British Museum.

The above description is almost entirely Lichtwardt's.

## 115. Hirmoneura cingulata, Luht.

Humoneura cangulata, Lachtwardt, Deut. Ent Zeits. p. 644, Q (1909), id, Rec Ind Mus 18, p 333, & (1913)

of Q. A small grey species with abdominal bands *Head* with eyes thickly pubescent, especially in σ, narrowly separated in σ; from scarcely wider in Q, bearing sparse black hair, around the antennal base with thicker yellowish-grey hair; antennæ, palpi, and legs all yellowish red.\* taisi hardly darker. *Thorax* blackish, with grey pubescence, which at the sides is longer and more yellowish *Abdomen* with basal part of 1st segment dark brownish, apical part pale slate-grey; rest of segments grey, with thin yellow pubescence and brown margins, in the σ the rows of abdominal pubescence are more erect and prominent, forming in both sexes on the side-margins almost bunches of yellow and black hairs intermixed. *Wings* grey, light brown anteriorly; halteres blackish brown.

Longth, 11-12 mm.

Described originally from the 2 sex only from India, the subsequently described from two specimens from Phagu, Simla Hills, 9000 ft, 12. v. 1909.

Type (2) in the British Museum, from the Saunders collection;

of the & & referred to, one is in the Indian Museum.

The above description is mainly Lichtwardt's, to which I have added a note or two from the Indian Museum specimen

# 116 Hirmoneura brunnea, Licht.

Humonewa brunnea, Lichtwardt, Deut. Ent. Zeits. p. 645, Q (1909).

Q. Near H coffeata, possibly a seasonal form of it

In this species the wings are proportionately much shorter, being only 11 mm. long to a body of 11 mm., plus ovipositor of 2 mm. to 3 mm. Apart from the difference in the proportions, the characters are mainly as in *II. coffeata*; the pubescence on the sides of the thorax and at the base of the abdomen is yellow, not pale brown, legs all yellowish red, wings rather duller in colour, and the fore border darker.

Described by Lichtwardt from a single  $\mathcal{P}$  in the British Museum from Trincomali, Ceylon, 3. iv. 1892 (Col. Yerbury).

## 117. Hirmoneura ochracea, Licht.

Hirmoneura och acea, Lichtwardt, Deut. Ent. Zeits. p. 643, 3 (1909).

- 3. Very near *H. austeni*. Body pale brown, with short velvety yellow pubescence, which is longer behind the scutellum and at the base of the abdomen. Eyes with distinctly yellow hairs,
- \* According to Lichtwardt, I call the legs bright yellow, as in H annandale:

closely contiguous, so that only a very small from remains, which latter is clothed with yellow other and dark brown hairs intermixed. Antennæ brownish, eye-margins bent, reaching to base of antennæ. Legs wholly yellow other. Wings yellowish grey, fore border yellow other.

Length, 18 mm.

Described by Lichtwardt from a single of from the Tau Plateau, Burma, 4000 ft., ii 1890 (Col. C. T. Bingham)

Type in the British Museum.

## 118. Hirmoneura austeni, Licht.

Hirmoneur a austem, Lichtwardt, Deut. Ent. Zeits. p. 643, of (1909).

3. A large robust species. Body deep dark brown, evenly clothed with long, erect, woolly, pale brown pubescence, which is thicker on the sides of the thorax and abdomen, where in certain lights it has a kind of bronze tinge. Head semicircular; eyes closely harry; frons broad, forming one-sixth the width of the head with dense deep black pubescence, epistome a little broader, black, with concolorous pubescence, a few light brown hairs only about the mouth-opening and around the short proboscis; antennæ and palpi black; the latter curving upwards, lying close along the eye-margins and reaching to base of antennæ. Lower surface of head and sternum with vellowish hair; venter with yellowish pubescence, the extieme base of abdomen with a narrow band of deep black hairs. Legs stout, reddish yellow, anterior femora brownish, with dense pale pubescence, which makes them appear even thicker. Wings brown, anteriorly darker.

Length, 18-20 mm.

Described by Lichtwardt from five of of in the British Museum from the Khasi Hills, Assam.

# 119. Hirmoneura coffeata, Licht.

IIn moneur a coffeata, Lichtwardt, Deut. Ent. Zeits. p. 644, ♀ (1909).

Q. A large species with coffee-brown body, rather bare, with some pale brown pubescence only on sides of thorax between the shoulder and wing-base; underside of thorax with patches of pale hairs above the front coxe and under the wing-base; everywhere else, including the venter, only very thinly pubescent. The pubescence on frons rather longer, and towards vertex it is blackish brown, at base of abdomen a narrow band of all black hairs. Wing surface uniformly coffee-brown, with bronze and cinnamon-brown reflections; alule very reduced so that the wing is almost clavate, legs paler brown than the body.

Length, 16 mm. + ovipositor 4 mm.; wing, 24 mm., breadth of

wing, 5½ mm

Described by Lichtwardt from a single 2 from Rambodde, Ceylon (Nestner).

Type in the Berlin Museum.

#### Genus TRICHOPSIDEA, Westw.

Trichopsulea, Westwood, Trans Ent Soc. Lond 11, p. 151, pl xiv (1836), Macquart, Dipt. Exot. 11, pt. 1, p. 397, pl. iii, fig. 1 (1840); \* Wandolleck, Eut Nach xxiii, p. 250 (1897)

GINOTYPE, Trichopsidea astracea, Westw.; by original designation.

Of the normal Nemestrand type; the species smaller than those of Atradops, with exceptionally long wings, alhed to Trichophthalma and Megistorhynchus. Three ocelli on a small conical tubercle; epistome (Estrid-like, mouth-parts very reduced and indistinct, mouth itself very indimentary; abdominal segments puffed up, genitalia in male clubbed; 2 unknown. First and last tarsal joints each as long as the other three together. Auxiliary and 1st longitudinal veins apparently united until beyond middle of wing, the former then turning up to costa rather suddenly; upper branch of 3rd vein tuined up suddenly, meeting 2nd vein about its middle, both branches of 4th vein apparently united at tip of discal cell, upper branch either single or, it forked, the lower prong may consist also of the tips of both the lower branch of the 4th vein and upper branch of the 5th. If this reading of the veins be correct there is a somewhat long posterior cross-vein. Anal cell open, axillary vein and squame absent

Range. Except dohrm from the Andamans and Sumatra, the only other known species (astracea, Westwood) is from Australasia.

### 120. Trichopsidea dohrni, Wand.

Trichopsidea dolo ii, Wandolleck, Ent. Nach. xxii, p. 251, figs. 7, 8 (1897); Lichtwardt, Deut. Ent. Zeits. p. 648 (1909).

- d. Ground-colour reddish brown, with not very reddishyellow hairs. Head rather broader than thorax, sluning golden brown; eyes contiguous below vertex, upper facets much larger than lower ones, three yellowish-brown ocelli on prominent vertical tubercle, with black and reddish-brown hairs, epistome Œstrid-like, with thick reddish-brown pubescence; antenna 3-jointed, 3rd joint rod-shaped, with undulating outline, at tip with some very short fine pellucid hairs, mouth-opening indistinct. Thorax brown, with fine velvet-like tomentum, showing several darker and lighter indistinct longitudinal stripes; in front and at sides with long thick reddish-yellow pubescence; scutellum pale brown, anterior margin darker; squamæ absent; halteres greenish yellow. Wings pale yellowish brown, with six clear-cut hyaline spots, which in certain lights show a pearly lustre; 1st longitudinal vem present; anal vem absent. Abdomen yellow, with velvet tomentum; 1st segment pale yellowish, 2nd with a pale
- \* Macquart's figure shows the broad elongate-conical labrum; the longer, concave, round-tipped labrum; and the long filamentous organs, all as described by Westwood, who assumed the latter to be "analogous to palpr" and stated that the mouth was rudimentary and concealed Wandolleck also describes the mouth as rudimentary

band interrupted in middle and with two pale side-spots; these spots occur on each succeeding segment also, and are visible, with the interrupted band, through absence of tomentum, venter pale yellowish red, with a darker mark at sides of each segment. Legs with cove, trochanters, and femora of both anterior pairs yellowish red, with moderately long concolorous pubescence, tibue lawnyellow with reddish-brown tips, hind femora long, thin basally, thence distinctly clubbed, the thin part fawn-coloured, the clubbed part reddish yellow, last tarsal joint and pulvilli reddish yellow, the other joints fawn-colour with darker tips; claws dark brown

Length, 10 mm, wing, 11.4 mm.

Described by Wandolleck originally from a type of from Sumatra, and Lichtwardt subsequently recorded another of from Ross I., Andaman Is, v 1904 (Col. C. T. Bingham).

Type in Herr Dohrn's collection at Stettin, the second speci-

men in the British Museum.

### Genus ATRIADOPS, Wand.

Atmadops, Wandolleck, Ent. Nach xxiii, p 245 (1897). Colar, Wiedemann (nec Hubner, 1810), Analec Ent p. 18, pl. i, fig 8 (1824), id., Auss. Zweifl n, p. 260, pl. ix, fig 11 (1830); Macquart, Dipt Exot ii. pt 1, p. 34, pl ni, fig. 2 (1840), Westwood, Cab. Orient Entom. p 38, pl xviii, fig. 5 (1847); Westwood, Cab. Orient Entom. p 38, pl xviii, fig. 5 (1847); Walker, Ins Saund , Dipt. pl v, fig. 4 (1850).

GENOTYPE, Colax javana, Wd., or C. macula, Wd.\*

Moderate-sized species with peculiar tomentose-like pubesconce and dark-coloured and spotted wings. Epistome (Estrid-like; eyes in & subcontiguous for a short space; ocelli absent, proboscis not obvious, if projecting from mouth-opening, hidden in the long hair of the face, antenna 3-jointed, much as in Hirmoneura. Thorax subquadrate, rather broader than long; abdominal segments somewhat puckered-up just before the hind margins, forming a blunt ridge; genitalia in o short, tip with a broader base, in Q longer with sabre-shaped lamellee. Hind femora slightly thicker; first and last tarsal joints each as long as remaining three together. Wings with auxiliary vein short, ending free at about opposite origin of 4th vein, 1st longitudinal and greater portion of vein "diagonal" considerably thickened, 3rd vein forked; 4th vein forked, anastomosed as usual for some distance with 3rd; lower prong of upper branch not always reaching wing-margin; † anal cell open, axillary vern present; thoracic squame well developed; two submarginal and four posterior cells, 1st sometimes divided

\* Both originally described together on the same page. I cannot personally decide and have seen no species set up as genotype.

<sup>†</sup> It does not do so in the one example of A. javana that I have seen, but Wandolleck figures it running to the wing-margin, with also a short cross-vehi between it and the vein in front (Ent. Nach. xxiii, p. 246, fig. 1, 1897).

by a cross-vein, 3rd closed, discal cell sometimes narrowly open, \* anal cell open

Range. The very few species known come from China, Brazil, Ceylon, Sumatra, Java, and South and West Africa.

# 121. Atriadops javana, Wied.

Colar quvana, Wiedemann, Analec. Ent. p. 18 (1824), id, Auss Zweifl ii, p 261 (1880).

Atriadops javana, Walker, Ins. Saund, Dipt pl. v. fig. 4 (1850),

Wandolleck, Ent Nach xxm, p 246, fig 1 (1897)

J. Head with eyes contiguous for a short space, from pale brownish grey, with greyish-white hairs; antenne pale brownish yellow. Thorax (?) blackish (discoloured, probably brownish in life), sides with longer whitish-grey hairs Abdomen brighter brown, each segment towards hind border drawn up slightly, forming a slight ridge, anterior half of each segment with fine golden-grey pubercence, which towards sides becomes longer, thicker, and whiter, and laterally on the hind margin of each segment is some long black pubescence Wings dark brown, the darker parts blackish, hind margin rather broadly greyish, except at extreme wing-tip, at tips of lower prong of upper branch of 4th vein, tips of both branches of 5th vein, two or three intermediate spots situated rather close together, and at tips of anal and axillary veins, at each of which is a small blackish-brown spot; similar dark spots occur on the distal side of the diagonal veins, at the juncture of the veins, and larger ones at the forking of both 4th and 5th veins; at the distal end of the 2nd basal cell is an ill-defined clearer space, and a similar subtriangular one extending from the 3rd vein just before it meets the 4th, which, inclining distally and diagonally, nearly reaches the costa. Thoracic squamæ considerably developed, with long greyish fringe

Length, 8 mm

Re-described from a single of in the Indian Museum from Trincomali, Ceylon, 10. ix. 1909 (Col. Yerbury), presented by Herr Lichtwardt, the species having been originally described from Java.

#### Genus CEYLONIA, Licht

Ceylonia, Lichtwardt, Deut. Ent. Zeits. p. 646 (1909).

GENOTYPE, Ceylonia magnifica, Licht.; by original designation.

Body robust, linear. Probosos hidden by the long hair of the face; palpi small, thin, † epistome pointed, as in Trichopsidea,

\* In Wandolleck's figure of A. macula, Wd (l c p. 247, fig 2), a Brazilian species, the discal cell is prolonged narrowly to the wing-margin, remaining open through the failure of the lower branch of the 4th vein to meet the lower prong of the upper branch. The species seems abnormal, as the 2nd longitudinal vein is either absent or the 3rd vein must be unforked. Also in the busal angle of the last posterior cell is very small quadrate additional cell.

† I follow Lichtwardt in stating that the face has long bair, but I have not noted this fact in describing my niva. In any case in my type of that species

the palpi are perfectly obvious.

Dicrotrupana, and Symmictus. Eyes in & contiguous for some distance, upper facets larger than lower ones, vertex very small, three ocellr on small prominent tubercle. Antennæ short, of normal Nemestrinid type; 1st joint cylindrical, 2nd half as long as 1st, 3rd globular, with apical bristle longer than the whole antenna. Wings with auxiliary and 1st longitudinal veins very long, straight, close together, ending at a little distance before wing-tip; 2nd vein beginning at half the wing's length, straight; 3rd beginning immediately afterwards, projected diagonally downwards, anastomosing as usual with 4th vein, forking shortly beyond; 4th vein with upper branch forked, the branches of 3rd and 4th veins all parallel with 2nd vein and with hind margin of wing, all ending above wing-tip, except the lowest, which ends exactly there; lower branch joining upper one just before forking of latter; 5th vein rather peculiarly forked, so that the shape of the last posterior cell at base is that of a slightly curved cone; posterior cross-vein absent, anal cell open, axillary vein long. Two submarginal and five posterior cells, 4th closed.

### 122. Ceylonia magnifica, Licht (Pl II, fig. 23.)

Ccylonu magnyfica, Lichtwardt, Deut Ent Zeits p. 646, & (1909). Atriadops nivea, Brunetti, Rec Ind Mus vii, p. 477, & (1912)

J. Head blackish grey, palpi thin, small, of same colour, eyes brown, very large, contiguous for half the distance from the very small vertex (bearing three small ocelli) to base of antenno, the first two joints of which are brown (3rd joint missing); underside of head with some grey hairs. Thorax thickly clothed with pale vellowish-grey hairs, which become white on the sides. Abdomen thickly clothed with pale yellowish-white hairs, which, seen in front, appear silvery white; venter dark grey, with grey hairs. Legs dark reddish brown. Wings clear, narrowly dark brown at base; also a narrow, irregular but clearly-cut stripe across the middle from the costa nearly to the hind border; a second wider similar band towards tip, which reaches the hind margin, spreading over both sides of the "diagonal" vein, and connected along the costa with a small apical spot, and proximally less distinctly with the median band, leaving a well-marked clear oblong spot between the 1st and 2nd longitudinal veins; a small brown spot on wingmargin at tip of 5th longitudinal vein and a larger one at tip of 6th.

Length, 12 mm.

The species was described originally by Lichtwardt from a single of from Pundaluoya, Ceylon (Green), in the British Museum. At the time of describing my nivea I had overlooked this author's paper on Oriental NEMESTRINDE, and the description given here is that of the type of my species from a single of in my collection from Haldumulla, Ceylon (Green).

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# Family CYRTIDÆ.

Head very small, subglobular, almost wholly consisting of the enormous eyes, which are contiguous in both sexes; vertex very small; from generally very small. Proboscis varying from very thin and elongate (as in some Bombyllidæ) to very short or obsolete; palpi generally obsolete. Antennæ approximate at base, placed in some genera well above, in others well below the middle line of the head, 3-jointed, variable in shape, 1st joint sometimes minute.

Thorax greatly humped; prothorax sometimes (Philopotine, non-Oriental) enormously developed; pubescence moderately thick, sometimes furry; scutellum large, without bristles, meta-

notum generally concealed by it.

Abdomen very broad and gibbous, often quite globular and pellucid, normally 5-segmented; pubescence variable; genitalia

inconspicuous.

Legs simple, comparatively short, rarely with a short blunt spur on middle tibis, or with one developed and one less developed spur on posterior tibis, or a circlet of very short spines on front tibis; 3 pulvilli; empodium as pad-like as outer pulvilli, claws long. The entire body is wholly devoid of spines or strong bristles.

Wings diverging and deflexed when at rest, longer in Q than in o; venation very characteristic, but a general interpretation of its varied forms would be out of place here, as only four genera Ambient vein at times quite absent, even above are Oriental. the wing-tip; auxiliary and 1st veins long, 2nd vein often absent: præfurca beginning about opposite the base of the discal cell; anterior cross-vein near base of discal cell, sometimes very short or absent, 3rd longitudinal vein generally forked, posterior crossvein present or absent, 4th vein with manifold ramifications: 5th vein generally forked, anal vein present, sometimes weak and, with the axillary vein, possibly absent. Technically two submarginal cells and from three (sometimes apparently only two, owing to the dividing vein being obsolete) to five posterior cells. venation in this family is, perhaps, not thoroughly understood vet.\* Thoracic squame enormously developed and very prominent, wrinkled, and generally pubescent, their size being one of the chief characters of the family

Life-history. The metamorphoses of several species are known, the larve being parasitic in the egg-cocons or the abdomens of spiders. The larva is amplimentatic (though Konig describes that of Oncodes as metaphenestic), short, thick, 12-segmented, with very

<sup>\*</sup> See Verrall, Brit Flies, v, p. 447 et seq.
† Astomalla lindanii, Erichs, Brauer, Verh. zool-hot Ges Wien, xix, p 737, pl xiil, flgs. 1-6 (1869), and in Denks Ak. Wies. Wien, xlvii, pl. v, flgs. 89-92 (1883). Oncodes pallipes, Latr., Menge, Schrift Danzig Natur. Ges. i, p. 37 (1869); Oncodes functius, Erichs, Brauer, Veih. zool-hot. Ges. Wien, xix, p. 737 (1869). Henops brunneus, Hutton, Maskell, Trans. Proc. N. Zeal Inst. xx, p. 106, pl. x (1888)

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small head and small mouth-parts, the posterior spiracles accompanied by peculiar large plates. Pupa free, with a median longitudinal row of spines on dorsum of thorax. Lundbeck writes of one species—"The larva was lying in the abdomen of a Cteniza ariana with the terminal spiracles in one of the lungs of the Cteniza. Before pupation the larva left the now dead Arachind and transformed in the nest." Stein and Konig state that the eggs of some species are deposited on branches of trees, also that the young larvae possess considerable leaping powers

The globular shape of the CYRTIDE with the very large squame and characteristic venation stamp the members of this family with a facies peculiarly then own, except for a few short, hump-backed BOMBYLIDE, but from these the three (not two)

pulvilli and the venation at once separate them.

This family is by some authors called the ACROCERIDE, but the name is "absolutely contradictory to most of the genera" (Veriall). The term Cyrtide was used as far back as 1841, the genus Cyrtus antedates Acrocera, and the family name is supported by Verrall, Osten-Sacken, and others \*

The range of the family is world-wide, but only about two

hundred species are known.

## Tuble of Subfamilies.

Prothoracic plates enormously developed, united dotsally, forming a large shield between mesonotum and neck.

Prothoracic plates not conspicuously developed.
Third antennal joint long and strap-shaped,

no trace of style or apical bristle
Third antennal joint generally short; apical
bristle or stiff hairs always present

Philorotin.E,p 158.

PANOPINÆ, p 160.

CYRTINA, p 163.

There are different views as to the location of some of the genera, as to then synonymy and their limits. I follow Verrall in keeping *Pterodontia* in Curtime.

# Subfamily PHILOPOTINÆ.

The principal character is the enormous development of the prothoracic plates. Only one species is Oriental

### Genus PHILOPOTA, Wred.

Philopota, Wiedemann, Ausser. Zweifl. 11, p 17 (1830).

Genotype, Philopota conica, Wied (Brazil).

Head much puffed out behind eyes, three ocellit; eyes con-

† According to Wiedemann , the lower ocellus in my species is not discernible,

but it is impossible to state definitely that it is not present.

<sup>\*</sup> The family has been called by various other names by different authors, INFLATE, for instance, and Oscodios, Kertész even retaining this latter name to the present day.

tiguous, pubescent; from slightly prominent on lower part; antenuæ elongate, porrect, approximate and bulbiform at base, situated immediately above base of proboscis, 3rd joint with apical bristle. Proboscis very long and thin, projected below the body to a considerable distance. Thorax with prothoracic lobes enormously developed, prominent, their inner angles touching one another. Abdomen conical (conica, Wied, type) or rounded (vwidænea) Legs of moderate length and size, of the normal Wings with auxiliary and 1st longitudinal veins Cyrtid type. long, nearly parallel, profurca beginning just before middle of wing; 2nd longitudinal vein long, ending much above wing-tip; 3rd vein simple, dying away a long distance from border of wing; anterior cross-vein present; 4th vein simple, nearly straight, almost attaining border, 5th vein simple, twice bent towards tip, anal vein long, reaching wing-boider.\*

Range. South Europe, Asia Minor, India, Japan, Mexico, and

South America.

The above is an attempt at an augmented description of the genus, as Wiedemann's was so short.† When additional species are known a further description may be given.

## 123 Philopota viridænea, sp. nov.

Head much extended behind the eyes, the surface shining oneous green, closely punctured, covered with rather dense, moderately short, yellow pubescence, eyes touching from just below the small vertex bearing the ocelli, I and with moderately short, not dense, dark brown pubescence, facets of uniform size, from of moderate size, flush with eyes at apex, but rather prominent on lower part, dark shining blackish brown, more or less yellow on lower margin, autennæ elongate oval, dark shining brown, with long, yellow, translucent style, cheeks blackish grey, the large, smooth, oval, shining black base of the proboscis beginning just below the antennæ; the rest of the proboscis bright yellow, bare, in length reaching under the body to tip of abdomen, the tip widely bifid. Thorax with the entire surface of dorsum and sides, and of scutellum, shining mneous green, closely punctured, covered with very short yellow pubescence. Prothoracic lobes very large and prominent, subtriangular, their inner angles contiguous, the upper angles tipped with yellow. Abdomen sineous green, closely punctured, with very short yellow pulescence, which on the last two segments and towards sides of previous segment is changed greyish; extreme side-margins of most of the segments

† Only the two upper ones are obvious, there should be three

<sup>\*</sup> Verrall suggests a different reading of the veins, calling them in older, auxiliary, 1st and 3id longitudinals, and 4th vein (forked, the anterior cross-vein being therefore absent)

f "Antennæ portect, approximate, small, inserted above base of proboscis, bulbiform, bristles aproal Proboscis elongate, deflexed before thorax. Eyes contiguous, harry. Three occili. Abdomen contcal"

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narrowly brownish yellow; venter dull meeous, with short whitish pubescence, genitalia concealed, somewhat yellowish. Legs blackish with short grey pubescence; femora black, extreme base and nearly the apical half yellow, rest of legs wholly vellow; all legs with very short inconspicuous pale pubescence, the three yellow pulvilli and the black claws distinct. Wings yellowish grey, considerably indescent and rippled; veins in anterior part of wing black and distinct, the remainder yellowish and less distinct. Thoracic squainm enormous, grey, with short greyish pubescence on disc and edge, sufficiently transparent for the brownish-yellow halteres concealed below them to be seen.

Described from a perfect unique from Dungagali, 8000 ft., Hazara District, 21-22. v. 1915 (T. B. Fletcher).

Type sent to British Museum.

# Subfamily PANOPINÆ.

Little can be added to the characters given in the table. The basal and discal cells are generally well defined.

### Genus PIALEA, Errohs.

Pialea, Erichson, Entomographica, 1, p. 160 (1840).

GENOTYPE, Pialea lomata, Erichs; by original designation.

Body of the normal Cyrtid type. Head very small, mostly occupied by the densely pubescent, contiguous eyes; occiput flattened, three ocelli; proboscis very short, no obvious palpi. Antennæ deflected, placed on the underside of a distinct tubercle in the middle of face between the eyes; 1st and 2nd joints short, bristly, 3rd very large, elongate, leaf-shaped with obtuse tip, much longer than two basal joints together. Thoracic squame enormously developed. Abdomen thick, oblong, conical, longer than thorax, densely pubescent, 6-segmented Legs of normal Cyrtid type, tibiæ ending in a small blunt tooth-like projection on inner side. Wings of moderate size, slightly elongate; costs ending at tip of lower branch of 3rd vein, immediately before wing-tip; auxiliary ven ends at from two-thirds of wing (auripila) to nearly end of wing (lutescens); 1st longitudinal vein very long; 2nd begins at one-fourth of the wing, straight or gently curved towards tip, ending just beyond 1st; 3rd begins very near origin of 2nd, widely forked towards tip, nearly straight, with lower branch ending below wing-tip (hitescens), or bent upwards, both branches ending before wing-tip (auripila); anterior cross-vein very near origin of 3rd vein, at basal end of the elongate discal cell, 4th vein with apparently both branches forked, upper prong of upper branch closing the 1st posterior cell and giving the appearance of another discal cell in front of and parallel with the true one. In lutescens upper prong of lower branch throwing off a veinlet

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closing discal cell (or it may be regarded as a discal cross-vein), in auripila, if such veinlet is a discal cross-vein, the 4th vein's lower branch is not forked, joining upper branch of 5th a little before margin of wing. Posterior cross-vein short; 5th vein forked, lower branch closing anal cell; axillary vein present (at least in auripila). Three submarginal cells, three or four posterior cells (first and last closed) \*

Range. The only other known species (P. lomata) is from

Brazıl.

Life-history unknown.

## 124. Pialea auripila, Brun. (Pl. II, figs. 24, 25.)

Pialea auripila, Brunetti, Rec. Ind Mus. vii, p. 472 (1912)

J. Head about half the full height of the thorax; eyes closely touching from the extremely small vertex to the base of the antennæ, rather densely covered with long brownish-yellow hair; vertical triangle with three ocelli, slightly elevated; occiput much flattened, with brownish-yellow hairs; proboscis very short, subconical, blackish, with some yellow hairs at tip, palpi not obvious; frontal triangle black, very small, projecting over basal joints of antennæ, which are short, a little broader at tip, blackish, with black bristles, the third joint of the shape of an elongated leaf, flattened, with obtuse tips, three times as long as the two basal joints together, yellowish, with dark brown lower margins. Thorax high, robust, nearly quadrate; ground-colour dark shining brown, closely covered with rather long thick bright golden-yellow hair. Scutellum and metanotum concolorous in ground-colour and hair with the dorsum; sides of thorax dull yellowish, with long thick golden-yellow hair; a little brownish hair is intermixed here and there with the yellow hair of the thorax. Abdomen robust, thickened, longer than thorax, oblongo-conical, tip pointed. Brownsh yellow, 1st segment very short; the dorsum of each segment mainly occupied by a large semi-circular dark brown spot at base, and extending in the middle of the segment to the hind margin, leaving the sides of the segments mainly yellow; 5th and 6th segments all black, the latter very small. Venter blackish brown, practically bare, emargination of segments narrowly yellow. The whole upper side of the abdomen with bright golden-yellow hair, which is brownish towards the tip. Legs with coxe half as long as femora, yellowish, with pale yellow hairs Tibe (which are a little longer than the femora) and tarsi black, with blackish-brown hairs; underside of tibiæ brownish yellow, and emarginations of the tarsal joints below narrowly vellowish; tibie a little broadened at tips, where they end in a small blunt tooth-like projection on the outer side. Tarsi a little longer than tibiæ, base of metatarsus (which is equal in length to

<sup>\*</sup> My reading of the venation in my description of P. auripia was slightly faulty, the present interpretation being more probably correct.

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the rest of the tarsus) pale yellow. Wings barely as long as abdomen, rather broad, tip rounded, pale grey; costal vein very distinct, ending at tip of lower branch of 3rd vein, immediately before the extreme tip of the wing, auxiliary (subcostal) and 1st longitudinal veins thick, the former ending at about two-thirds of the wing, the latter a little beyond it, both nearly straight, distinctly separate (though approximate) from just beyond the humeral cross-vein, the 2nd and 3rd longitudinals with the anterior cross-vein have the appearance of springing from a common stem (or else the 3rd longitudinal and the anterior crossvein spring simultaneously from the 2nd vein at a little beyond its base), 2nd vein nearly straight, but curved upward at its tip, to the costa. 3rd vein nearly straight, and in a straight line with the præfurca, forking widely towards its tip, and becoming suddenly much thinner, both branches ending in the costa distinctly before the wing-tip, anterior cross-vein short, near base of discal cell; 4th longitudinal vein forking just, before anterior cross-vein, upper branch nearly straight for more than half its length, thence with a slight curve, forked, the upper





Fig 10 -- Pialea auripila, Brun, antenna

Fig 11 - Pialea awripila, Brun, wing

prong erect, closing 1st posterior cell, lower prong running to wing-maigin; lower branch of 4th vein also comparatively straight, forked so widely towards its tip that the prongs are nearly in the same straight line with one another, upper one closing discal cell, lower one joining upper branch of 5th voin towards its tip, closing 3rd posterior cell. Posterior cross-vein very short, placed at about middle of discal cell; 5th veni thickened, forked near its junction with posterior cross-voin: lower branch closing anal cell First basal cell rather large and broad, bounded distally by the anterior cross-vein; 2nd basal cell much longer and narrower, bounded distally by the posterior cross-vein; discal cell elongate, about 31 times as long as its greatest breadth. The 1st submarginal cell nearly as long as the marginal and narrowed at wing-margin, 2nd submarginal cell The 1st posterior cell embraces the wingsmall, subtriangular. tip, but the upper prong of the upper branch of the 4th vein divides the cell at two-thirds of its length; 2nd posterior cell large, of irregular shape; 3rd closed, much wider distally; 4th subtriangular, formed by the branches of the 5th vein; anal vein slightly curved; axillary vein short, axillary cell large. Alulæ

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very small; squamæ pale yellowish, the upper ones small, the lower ones very large and pubescent. Halteres yellowish.

Length, 12 mm.

Described from a single perfect of in the Indian Museum from

Kurseong, 6000 ft, 26 vm. 1909 (D'Abreu).

This species is undoubtedly a Pialea, though it offers a slight variation from the venation of the type species, and the shape of the abdomen is different. In my remark after my original description of auripila about Westwood's figure of the antenna, I overlooked his statement in his description of the tubercle on the face and the fact that the antenna are placed on the underside of it. This fact further convinces me that my species is correctly placed in Pullea.

# Subfamily CYRTINÆ.

Prothorax not forming a dorsal shield in front of mesonotum. Third antennal joint normally short, with apical arista or hair-like rays,

Three genera are Oriental, and are easily distinguished as follows:—

An additional cell in wing above the discal and about as long.

No such cell.

Lasia, Wd , p 163

Costa with an angular projection at tip of 1st longitudinal vein, antennal tip with three stiff hairs, or a style bearing three such hairs. Costa without such projection, antennae ending in a long arista.

[p. 165 PTERODONTIA, Gray, [p. 168 Oncodes, Latr.,

#### Genus LASIA, Wied.+

Lasia, Wiedemonn, Analec. Entom p 11 (1824); id., Ausser. Zweiß i, p. 329 (1828)

Mesophysa, Macquart, Dipt. Evol. 1, pt 2, p 166 (1838).

Verteinstemma, Bigot, Ann. Soc. Ent. France, (3) 1v, p. 65 (1856).

Verticistemma, Bigot, op cit. vii, p. 200 (1859).

Genotype, Lasia splendens, Wied. (Brazil).

Body of the usual Cyrtid type. *Head* with eyes bare, contiguous in both sexes, facets very small, of uniform size, no ocelli; proboscis from a little shorter to a little longer than the body, narrow, cylindrical; palpi apparently absent or obsolete. Antennæ 3-jointed, porrect, approximate at base, diverging; 1st joint cylindrical, short; 2nd broader than 1st, wider towards the

\* P. lomata, Erichs. (as P lutescens, Westw., sp. nov) Trans. Ent. Soc. Lond (1876) pl. vi This is the only other known species, and is from Brizil. † Kertész in his catalogue ranks Lasia as synonymous with Panops, Lam. (Ann. Mus d'Hist Nat in, p 268, 1804). Nearly all the species have been described under Lasia, and, as Verrall accepts it without comment, I follow him It is a moot point if Lasia should belong to the Panopinm or Cyrtins.

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bluntly truncate tip; 3rd elongate lance-shaped, bare, shining, produced into a long style, which is longer than the entire Thorax and abdomen densely pubescent. Wings with auxiliary voin ending moderate length, simple. about middle of costa; 1st longitudinal ending towards wing-tip, nearly straight, 2nd starting soon after humeral cross-vein, nearly parallel with 1st, both slightly upturned at tips; 3rd beginning immediately beyond base of 2nd, desconding in a straight me diagonally across the wing, forking abruptly beyond its middle, the two branches curving upwards, practically parallel, ending above wing-tip, 2nd submarginal cell truncate at base; anterior cross-vein just beyond origin of 3rd vein, very near base of discal cell, short; upper branch of 4th longitudinal vein forked at tip of discal cell, at which point a short transverse vein connects with the forking of the 3rd vein; lower branch of 4th vein simple, suddenly recurrent towards tip, ending jointly with upper branch of 5th vein at about middle of hind border of wing: discal cross-vein long, closing discal cell, 5th vem forked at half its length, upper branch meeting 4th vein at middle of discal cell, lower branch closing anal cell well before margin; posterior cross-vein absent, axillary vein foreshortened Two submarginal cells, five posterior cells, 1st divided by a transverse vein,\* 4th Squamæ very large. closed

Range Europe, India, Australia, North and South America.

Life-history apparently unknown.

The present description is built up mainly on L. aurata, as the genus does not appear to have been diagnosed since Wiedemann tounded it. Some of the characters herein given may require modification, as no other species is available for comparison.

## 125. Lasia aurata, sp. nov.

Head with vertical triangle black, roughened, elevated, with long chrome-yellow, rather drooping, bristly hairs; eyes black, facets very small, of uniform size, with no trace of any transverse channels across the discs; frontal triangle elevated, black, shining, bare. Antennal 1st and 2nd joints bright yellow, short; 2nd

\* In his notes on the genus Lana (Brit, Flies, v, p. 450) Verrall distinctly states that the extra cell "is a second portion of the upper bosal cell and not a basal part of the 1st posterior cell," and he compares the vention with that of the Nemestanidae, but I venture to think that the anterior cross-vein (also recognised by Veirall as such) cannot be placed in the busal cell, but must, when present, invariably divide the 1st basal from the 1st posterior cell. It seems to me that the short cross-vein connecting the 3rd and 4th veins in Lana and one or two other genera in this family (Eulonchus, Pteriparus, etc.), represents the point at which in the Nemestanidae the 3rd and 4th veins ansatonose, which in that family occurs in contact with the discal cell and not distinctly beyond it as in Overtiae. Even if in Nemestanidae this usually punctiform contact is replaced by a short cross-vein, it should be regarded as identical with the same extra cross-vein in Overtiae and Nemestanidae.

subcylindrical, narrower at base, tip almost rounded, 3rd shining chestnut-brown, base yellowish, lance-shaped, the tip drawn out into a long concolorous style, which is about as long as the whole antenna; 2nd joint with yellow hairs. Face, except immediately below antennæ, deeply sunken between the eyes, shining black, bare, narrower on upper part, occuput grey, covered along the margin apparently with long bristly bright yellow scale-like pubescence.\* Thorax moderately shining black on disc, with apparently a slight seneous tinge, the dark colour extending forward in a broad band to anterior margin, rest of dorsum bright yellow, including shoulders, humori, and mesopleura, ground-colour of scutellum brownish yellow, that of remainder of the pleuræ grey or yellowish grey; whole thoracic dorsum, scutellum, and plenræ covered with dense long bright yellow bristly scale-like pubescence, which becomes a little paler over shoulders and lower part of sides of thorax, and more orange over scutellum and on hinder part of thoracic dorsum. Abdomen yellowish brown, lighter on 1st segment and deeper on 3rd and 4th; a'l segments with a well-defined lemon-yellow hand border of moderate width, broadest and least well-defined on 1st and 5th segments, on which latter it occupies more than half the surface Whole dorsal surface covered with moderately short light brown pubescence, and towards tip some microscopic pale yellow depre-sed hairs. Venter mainly vellowish, with a blackish median band on hinder part and some transverse black marks on 3rd and 4th and following segments, generalia inconspicuous, hidden. Legs wholly lemon-yellow with short soft concolorous pubescence practically clear to base, distinctly ribbed; veins brown; thoracie squame pale yellow, with long bright yellow fringe.

Described from a single specimen in the British Museum,

labelled simply "Ind."

style

# Genus PTERODONTIA, Gray.

Pterodontia, Gray in Griffith's Amin. Kingd. xv, p. 779 (1832) Pterodontia, Macquart, Hist Nat. Dipt. ii, p. 514 (1835).

GENOTYPE, Pterodontia flavines, Gray; by original designation.

Body of the normal Cyrtid type, pubescent. Head extremely small, nearly wholly occupied by the eves, which are very large, contiguous in both sexes, densely pubescent; three occili; mouth-opening more or less concealed; proboscis short. Antenna situated at bottom of head, 3-jointed; 1st cylindrical, 2nd short, 3rd conical, with (according to Macquart) a long bare style, but in P. dorsalis with three very long fine stiff hairs.† Thoracic lobes developed; thoracic squame enormously so. Abdomen

<sup>\*</sup> The head is so closely affixed to the thorax that it is difficult to state whether the adjacent pubescence belongs to the thorax or the occupit.

† These might easily cling together, giving the appearance of a long bare

short, rounded, very tlick, 6-segmented. Legs of normal Cyrtid type, tibiæ ending in a well-developed blunt spine on front side, with a smaller less developed one on inner side. Three pulvilli greatly developed; claws long and strong. Wings with a very conspicuous angular projection in the costa at tip of 1st longitudinal vein, at about three-fourths the length of the wing, the costa being considerably thickened at the spot, auxiliary vein ending in costa at about middle of wing; 2nd vein beginning just before middle of wing, curving upwards towards its tip and ending only just beyond tip of 1st vein, 3rd vein beginning soon after origin of 2nd, simple, forming a decided upward curve and ending much before the wing-tip, at which spot the costa ends, anterior cross-vein absent, forking of 4th vein enclosing a discal cell, closed distally by the discal cross-vein, posterior cross-vein absent; 5th vein forked, the upper branch forming lower side of discal cell, anal cell closed, axillary vein absent. One submarginal and two posterior cells, the 1st exceedingly large, embracing wing-tip

Range Europe, N and Cent America, Brazil, Somaliland,

Australasia

Life-history unknown

Macquart gives a figure of a wing and head of Pterodontia\* in his Hist. Nat Dipt. (pl xxi, figs. 5b and 5a, respectively), but while the wing is of this genus, though very incorrectly drawn, the head is that of an acalyptrate Muscid, and he acknowledges this error later (Dipt Exot ii, p 1), where he gives (pl i, fig 2) a correct wing, and states that the acalyptrate previously liquid is Trigonosoma perilampiformis.

# 126. Pterodontia kashmirensis, Licht

Pten odontia kashmirensis, Lichtwardt, Deut Ent Zeits. p. 121 (1909).

The two species described here are evidently very closely allied, if not identical. Their only distinctions appear to be as follows:—

Sides of thorax clay-yellow, with a round black spot, coxic all pale
Sides of thorax black, except mesopleura, which is brownish yellow with a square black spot, coxic blackish

Lushmurensis, Lucht.

dorsolineata, Brun

o. "Distinct by the globular body, the low-placed head, and the remarkably shaped wing; a conspicuous clay-yellow species with black markings. From the head hindward runs a narrow black stripe up to about one-third of the thorax, where it widens into an oval spot which reaches to the scutellum; sides of thorax clay-yellow, with a distinct round black spot directly in front of the wing-base; scutellum bearing an elongate transverse middle

<sup>\*</sup> P macquarte, Westw (flavipes, Macq, nec Gray).

spot, leaving a pale margin all round of uniform width; underside of thorax shining black. Abdomen with 1st segment wholly black, 2nd broadly black in the middle, so that about one-fourth of the segment on each side remains pale, 3rd and 4th segments each with a blackish triangular mark, with rounded angles and with the apex directed backwards, both segments bearing also a black ounded spot towards the anterior angles, 5th segment wholly black, except for a narrow yellow hind border with a tooth-like extension in the middle, 6th segment similar, with rather stout genital organs. The yellow antenne, which are placed so low that they touch the front coxe, consist, so far as can be seen, of a cylindrical joint and a globular one, half as large as the 1st, on the latter is a yellow bristle, which at a magnification of 27 (Zeiss) is seen to be composed of two hairs separated at the base distinct ocelli are placed on the occipital margin almost directly over the antennæ, eyes very harry Whole body with short pale pubescence, with which some darker hairs are intermixed only on the blackish markings and on the middle coxe. Legs wholly pale ivory-yellow, with large yellow empodia, the claws wide apart, black on the apical half. Wings hyaline, with yellow veins, the costal projection rather pointed

"The species is distinct from  $\dot{P}t$  waxelu, Klug, with the type of which in the Berlin Museum I have compared it, and from flavines, Macq., by the entirely pale cover and temora." (Lichtwardt)

Longth, 8 mm., wings, 8 mm. Kulu, Kashmir, 5000 it

Type (presumably) in Lichtwardt's collection.

# 127. Pterodontia dorsolineata, Brun. (Pl. II, figs. 26, 27.)

Pterodontia dorsolineata, Brunetti, Rec Ind Mus. vii, p. 475, pl xxvvii, figs 8, 9, 10 (1912).

Q. Head with eyes very large, black, closely contiguous, rather thickly pubescent; occiput moderately puffed out, dark grey; vertex small, three dull red ocells. Antenno yellowish, the three joints nearly equal in length, but the 3rd rather the longest, with three very long straight bristly hairs at tip. Proboscis distinct, but short, evlindrical, pale yellow. Thorax brownish yellow, the dorsum mainly occupied by a large black shining spot, which is continued forward as a stripe as far as the anterior margin; sides of thorax black, except the mesopleura, which is brownish yellow, with a square black spot in the middle. The whole thorax covered with brown or yellowish hair, concolorous with the colour of the surface. Scutellum brownish yellow, pubescent, with a large basal, nearly circular, black spot. Abdomen brownish yellow; lst segment all black; 2nd all black, except towards the sides; 3rd, 4th, and 5th with a black spot on each segment, widest in front, extending from fore to hind margin, except on the 5th segment, where the spot fails to reach the latter; these spots 168 CYRTIDÆ.

form, with the black colour of the 2nd segment, a conspicuous, clear-cut, dorsal band of pregular width, 6th segment wholly black, on each of the 2nd, 3rd, 4th, and 5th segments is a subquadrate black spot placed configuous to the anterior and lateral margins. Venter yellowish, the segments faintly conarginate with brown, unmarked. The whole abdomen bears brown or yellow pubescence, concolorous with the colour of the surface Legs wholly yellowish, except the blackish coxo. The middle femora and thing are distinctly longer than the fore pair, and the hind pair are proportionately longer than the middle pair. Thurs long, the anterior ones about equal in length, but the hind pair are distinctly longer, proportionately. The tibus end in a well-developed (almost Bibio-like) blunt spine on the front side, with a smaller one (easily seen on the hind legs only) on the inner side. The pulvill, three in number, elongate, very greatly developed,



Fig 12 -Pterodontia doi solingata, Brun , wing.

the claws very long and strong, curved. Wings colourless, voins yellow, venation normal, upper squame quite small, nearly circular, lower pair very large, with a short yellow fringe, both practically colourless, halteres black.

Length, 7 mm

Described from a single specimen in the Indian Museum from Maymyo, 3800 ft, near Mandalay, Upper Burma, v. 1910 (II. L. Andrewes)

This species must be very near and possibly identical with kashmirensis, Licht.

# Genus ONCODES, Latr.

Oncodes, Latreille, Précis Caiact. Gen. Ins. p. 151 (1796). Henops, Meigen, Illig Mag. n, p. 226 (1803)

GENOTYPE, Musca grbbosa, L., by original designation.

Head nearly all eyes, which are larger in of than Q, bare; vertex very small, two ocelli, from slightly produced; proboscis and pulpi apparently absent, the aperture closed by a membrane. Antennæ placed at extreme lower part of head, 2-jointed; lsi joint short, thick, cylindrical; 2nd oval, ending in a long thin arista-like style, dilated at base, and with a hair-like bristle at tip. Thorax spherical; humeral, prealar, and postalar calli large, but not very conspicuous; pubescence moderately dense; scuttellum large, with very deep rounded margin, leaving only a small disc; metanotum rather small. Thoracic squamæ enormous, with

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dense pubescence, alar squame with soft down, halteres short. Abdomen dorsally arched, lower side more or less flat, 5-segmented, short ovate in d, short and round in Q, pubescence moderate, genitalia concealed. Legs rather short and stout, simple, no spurs, tarsi with 1st and 5th joints longer than the others; pulvilli and claws distinct. Wings in & short, in 9 larger and longer, venation imperfect, the veins failing to reach the margin; 2nd longituduml voin absent, 3rd nearly straight, unforked, projected in a direction much below wing-tip; anterior crossvem apparently present, though weak; 4th vem forked, lower branch again lorked, 5th vein forked widely, the upper branch sharply angled, at which point it seems anastomosed with the lowest branch of the 4th vein, so it is difficult to say if the posterior cross-vein is present or not, and and avillary veins present, weak. Two basal cells, fairly distinct, no discal cell; posterior cells merged in the open hand part of wing, anal cell open owing to the foreshortened anal vein.

Range. Europe, N. America, N. Africa, Asia, Australasia.

Life-history of two or more European species more or less known.

## Table of Species

fuscus, Brun., p. 171 1. Abdomen without bands Abdomen with pale transverse bands 2. | p. 170. | octomaculatus, Brun., 2. Conspicuous pale spots on abdomen Without abdominal spots 3 Posterior corners of thorax and hind margin [p. 171. rufomarymatus, sp. n., of scutellum distinctly pale .... These parts not pale . 4. Thorax unmarked; wings brownish yellow; [sp n., p. 171. basal half of tibie tawny, length 5 mm. angustima ginatus, Thorax with two tawny stripes, wings clear; logs black, except coxes below and knees, length 3 mm. .... costalis, Walk., p. 160.

# 128. Oncodes costalis, Walk.

Henops costalis, Walker, Ins. Saund., Dept. pt. 3, p. 203 (1852).

"Head black, feelers tawny; chest and breast pitchy, clothed with pale tawny hairs, chest adorned with a tawny border and two tawny stripes; abdomen pitchy; hind borders of the segments whitish; legs pitchy; hips beneath, knees, and fore feet tawny; wings colourless, wing-ribs and veins dark tawny; veins partly pitchy along the fore border; scales pale grey, with tawny borders. Length of the body 1½ lines, of the wings, 3 lines. East Indies." (Walter.)

A specimen is in the British Museum, labelled simply "Ind.," and I am informed that it probably came from India proper.

<sup>\*</sup> Vorrall says it is absent ! See p 157.

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#### 129. Oncodes octomaculatus, Brun. (Pl. II, figs. 28, 29.)

Oncodes octomaculatus, Brunetti, Rec. Ind. Mus. vii, p. 476 (1912)

d. Head with eyes very dark reddish brown, bare; vertex and back of head blackish, two ocelli present. Antennæ normal (apparently, as they are not properly visible), terminated by a long arista, which is slightly thickened at the base, and is thinnest in the middle, the tip provided with two minute stiff hairs brownish yellow, with three dorsal clear-cut black stripes of moderate and equal width, the median one attaining the anterior margin, the outer ones considerably to eshortened, hinder part of dorsum all blackish, the colour extending to the scutellum; the metanotum brownish yellow; a short black streak (which in one specimen forms nearly a complete circle) on each side in front, below each shoulder, sometimes joined to the tips of the outer dorsal stripe; a small blackish mark at base of wing, and the underside of the thorax mainly blackish Thorax with a little light yellow pubescence generally distributed both on dorsum and Abdomen mainly blackish, with light yellowish pubescence,



Fig 13 -Oncodes octomaculatus, Brun , wing

hand margins of segments narrowly pale yellowish whate, the colour widest on 5th segment; 2nd segment with two large oval greyish-white spots nearly filling the dorsum, but quite clear of the borders in all directions, 3rd and 4th segments each with a pair of moderate-sized brownish-yellow spots, one on each side of the middle; 5th segment with an elongated similarly coloured spot, clear of the borders in all directions, and nearly filling the segment, 6th segment much smaller, practically a replica of the 5th; lateral margins of each segment occupied by a shining black elongate spot, which does not overlap the pale hind margin. Venter pale yellowish, sometimes (in one example) a black spot towards the lateral margins as on dorsal surface. Legs brownish yellow; hind pair with coxe more or less at base, femora at base and a broad subapical band, and tibie and tarsi almost wholly. brown or blackish. Wings yellowish grey, venation normal; squame dirty grey, shortly and closely pubescent, and of the normal enormous size.

Length, 4 mm.

Described from two of in the Indian Museum, from Igatpuri, Western Ghats, Bombay Presidency, 20. xi. 1909 (Annunidale); Nasik, Bombay Pres, in. 1911. ONCODES 171

#### 130. Oncodes fuscus, Brun.

Oncodes fuscus, Brunetti, Rec. Ind. Mus vii, p 477 (1912)

<sup>9</sup> Q. Head wholly blackish, eyes closely contiguous, vertex a little prominent, two ocelli; some black hairs on the rather puffed-out occiput. Arista pale yellowish, nearly transparent, shaped as in O. octomaculatus, Brun. Thorax wholly dark shining brown, with greyish-brown pubescence. Abdomen dark nutbrown, with greyish-brown pubescence, the sides and venter a little darker, hind margins of segments with a trace of a narrow black border. Legs uniformly brownish yellow; coxe darker brown. Wings colouless, the stronger veins brownish yellow.

Length, 3 mm

Described from a single specimen in the Indian Museum from Sahelwa, Bahraich District, United Provinces, India, 2 in 1909 From the relatively smaller size of the head and the more puffed-out occiput 1 infer that the present specimen is a 2.

In the Pusa collection is an Oncodes representing a new species allied to fuscus from Bengal, but the abdomen is missing.

### 131 Oncodes angustimarginatus, sp nov.

Head with from and antennæ brownish yellow, eyes and vertex black, occiput blackish, with a row of bristly black hairs towards the margin Thorax moderately shining black, covered with moderately short, rather dense, brownish-yellow pubescence; scutellum similar. Abdomen moderately shining black, with minute black pubescence, hind margins of all segments clearly defined, narrowly cream-yellowish, venter mainly yellow, basal part black. Legs shining black, minutely pubescent; basal half of all tibus brownish yellow, the colour rather more extended on inner side, tarsi dark brownish black, more than the basal half of metatars brownish yellow, claws black. Wings distinctly brownish yellow, voins very dark brown; thoracic squams shining black, with minute yellow pubescence; halteres yellow, knobs black

Length, 5 mm.

Described from a single specimen in the British Museum from Pirivipancherum, Ceylon, 21. i. 1892 (Col. Yerbury) A note adds:—"Only example seen; at top of hill, found near form of a sambur." A second specimen from Pusa, 6. xii. 1911, with the thorax all black.

## 132. Oncodes rufomarginatus, sp. nov.

Head with eyes black; the triangular frons blackish, with microscopic grey pubescence; extreme margin white-dusted. Antenne with 1st and 2nd joints black, with microscopic grey pubescence; 3rd of normal shape, basal swollen part shining brownish black, remainder brownish yellow. Tho ax moderately shining black, dorsum wholly covered with fairly dense, pale

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yellowish-grey pubescence, which extends over the upper pleurio and the scutellum, the large posterior calli reddish brown, as is the posterior maigin of the scutellum wholly (type) or in part (cotype), a similarly coloured spot on pleuro about halfway between base of wing and middle coxe; lower part of pleurie blackish grey, bare of pubescence, but with microscopic grey dust Abdomen with ground-colour black, surface slightly roughened, the very short 1st segment with an extremely narrow bone-white hind margin; remainder of segments with similarly coloured hind margins, nairowest on 2nd segment, especially in the middle, broadest on 3rd, 4th, and 5th segments, the white margin does not reach the actual sides of the dorsal plates (except on 5th and perhaps 6th segments), though a fine pale yellowish-white line does actually continue right through to the extreme edge. The side-margin of the dorsal plate is occupied by a moderately broad black band, which practically dies away just beyond middle of Venter mainly bone-white, base of most segments 5th segment blackish brown, narrowly in middle and broadly towards sides, leaving a whitish stripe below the black side-margins of the dorsal plates; towards each side of the 2nd, 3rd, 4th, and 5th segments is a rather large reddish-brown spot, fairly well demarcated from the black and bone-white parts Legs with come and about basal two-thirds of anterior femora and three-fourths of hind pair shining black, remainder reddish brown, tibic reddish brown, about middle half of hind pair blackish, all tarsi black Wings absolutely clear and transparent practically to the extreme base, veins yellow, costa dark brown, thoracic squame pale dirty white, with whitish microscopic pubescence and a very narrow pale yellowish border; halteres brownish yellow

Length, type 6 mm., cotype 41 mm.

Described from two specimens in the British Museum from Nuwara Eliya, Ceylon, 18. v. 1891 (type), and 14. viii. 1891 (Yerbury).

In the cotype the reddish-brown spots towards the sides of the abdomen are less well delimited; the general ground-colour of the abdomen is more nearly very dark brown than black; the pale hind border on the 2nd segment is broader than in the type; and the red on the scutellar hind border is confined to the central part. This specimen bears a label: "rare, sented on grass stalks."

On comparing the present form with the very lengthy description of O gibbosus given by Verrall, the agreement is certainly striking; but, though that author says he examined a large number of specimens, he makes no mention of the very conspicuous reddishbrown posterior call and hind margin to the scutellum. It seems justifiable, therefore, to regard the present form as a distinct species.

# Family BOMBYLIIDÆ.

Head rounded or transverse, generally narrower than, sometimes as wide as, larely wider than thorax, and set closely on it; frons and face not sunk between the eyes, occupit generally enlarged posteriorly, except in Systropine; ocelli present. Eyes bare, usually contiguous or subcontiguous in the &, but in Anthraoine always considerably separated in both sexes, but sometimes more so in the Q, in Systropine contiguous in both sexes. Probosus generally very long, slender, and porrect, in some genera and in Anthraoine short and thicker, labella small or very small, rarely of moderate size; palpi with one or two joints, often inconspicuous. Antennæ porrect, approximate or remote at base, 3rd joint not annulated, but in some species with a suture near the base of the joint; style generally present, even if minute, sometimes with a constriction in the middle, sometimes it is replaced by a pencil of stiff hairs (Argyramæba).

The ax in Bombylius and some other groups of genera with dense furry pubescence, often thicker and scale-like about the wing-roots, cheetotactic bristles frequently present. In Anturacine clusters of distinct scales often present, generally about the wing-roots, and when abundant the furry pubescence usually less dense. Metapleure generally densely pubescent, but hypopleure usually bare. Scutellum generally clothed like the thorax, sometimes with bristly hairs or with scales; metanotum

small, hidden.

Abdomen in Bombyllink "almost globular and clothed with dense furry pubescence, intermingled with which may be some longer straggling hairs; or (Antiracink) more elongate, with almost parallel sides and less furry pubescence on at least the disc; or (Cyllenia, Mulio) with strong hind-marginal bristles, or (Systropus) very elongate, slender, and bare; the 6th to the 8th segments often difficult to trace under the furry pubescence" (Verrall). Genitalia inconspicious; in the 3 sometimes turned to one side; in Antiracink the ovipositor in many species with a circlet of spines.\*

Legs generally rather long, slender, and weak, used for alighting only. Thickened bristles "like little sticks" occur sometimes on the femora, especially on the lind pair; rows of inconspicuous spicules on the tibie, in Toxophora replaced by stick-like bristles; tibie generally with an apical circlet of bristles, tarsi with numerous short bristles; pulville two, often vestigial, empodia minute, claws of moderate size or small, or the front pair only smaller than the others.

\* It has not always been possible to examine the genitalia satisfactorily. In such cases I have assumed the sex from the comparative width and shape of the from

Wings of moderate size or elongate. Venation conspicuous by the absence of the posterior cross-vein, the upper branch of the 5th vein forming for a longer or shorter distance (rarely punctiform) the lower side of the discal cell. Subcostal cell usually narrow, the auxiliary and 1st longitudinal veins sometimes almost Submarginal cells normally two or three, rarely one only (Cyrtosia), sometimes four (Hyperalonia), \* 3rd vein simple or forked, when the latter, the fork encloses the wing-tip. Discal cell normally present, rarely absent † Three or four posterior cells, anal cell open or closed. Wings bare, but the costa bears small spines at the base, where there is often a patch of them of considerable size, often intermixed with scales. Alulio small. alar squamæ rather large, with a thickly-set, rather long, broad. flattened scale-like fringe (Anthraw), or with a woolly, long marginal fringe, or moderately developed, with a short delicate fringe Frenum sometimes distinctly widened before the angle, and bearing long hairs similar to those surrounding it, but otherwise the thoracic squame absent. Halteres small, often not easily

Lafe-history. That of many species is more or less known They are mostly parasitic on Lepidoptera, especially on the genus Agrots and other Nocturds. also on the larve of bees, wasps. ichneumons and Tachinids that are themselves parasitic on Lenidonterous larvæ. Callistoma is parasitic in the egg-capsules of The Bombylud larva is amphipmensic, cylindrical, rather flattened, 13-segmented; an obvious, though small, retractile head with well developed mouth-parts, papillate antenna. and no eyes. The young larva is elongate, each thoracic seg ment with a pair of long setæ, the penultimate segment with two spiracles, the adult larva is obese and without some. Pupa free, mummy-like, with strong spines on head and anterior part. abdominal segments with chitinous hooklets. The pupa has prothoracic and seven pairs of abdominal spiracles, some species bearing transverse rows of spines on most of the segments. BOMBYLIDE contain many of the most brilliantly coloured Diptera and attain considerable size, the wings being frequently very prettily marked, whilst the body is often adorned with bright tufts of gorgeous pubescence or patches of coloured scales. The family is a very large one and is of world-wide range, occurring mostly in dry sunny or sandy localities, many of the species being exquisite hoverers. The members of the family may be recognised by absence of the posterior cross-vein (although this is not always obvious to the mexperienced), the few posterior cells, and the furry pubescence of most of the species. They are most nearly related to the CYRTIDE and the THERBYIDE

† Cyrtosia and Apolysis, for example, amongst Palmarotic genera.

<sup>\*</sup> Additional cross-veins occasionally cause five submarginal cells in individuals, or, more rarely, in species.

#### Table of Subfamilies

1. Prefure comparatively long, 2nd longitudinal vein originating in knee-shaped form from it, approximately opposite anterior cross-vein (at most half-way between origin of profure and the cross-vein, and this only in some species of Argyr anwha),\* antenno widely separated at base, from in 3 nearly as wide as in 2...

Prefurca comparatively short, 2nd vein originating acutely (not in knee-shaped form), always much nearer origin of prefurca than of antenor cross-vein, antenne nearly always approximate at base, eyes in 3 normally contiguous or nearly so, sometimes distinctly separated, but from always much nairower than in 2 †

2 Abdomen, hind legs, and antennic conspicuously long, eyes normally contiguous in both sexes; only three posterior cells, thorax not unusually humped, occuput concave; bare species

antenue never conspicuously long ....
Abdomen more or less cylindrical, bare or with bristly hairs; antenue very long, especially 1st joint, proboscis nearly always long (Thorax more or less humped, generally with conspicuous bristles; abdomen drooping; prothorax sometimes forming a shield, body often with scaly pubescence) . . . .

4. Abdomen short and rounded, thorax and abdomen generally with dense furry pubercence, proboscis long and with small labella, † thorax generally arched; 2nd longitudinal vein never with a strong loop near tip; head generally narrower than thorax....

Abdomen oblong, rather flattened, seldom really furry; proboses generally short and with larger labella, thorax generally

Антинасим, р 176.

Systropina, p 289.

j

4

Тохорионамж, р. 286.

Вомвилим, р. 259.

<sup>\*</sup> At least two (European) exceptions are known, Callisioma and Mulio.

† Some species of Usia have the eyes in the of widely separated, but they are easily recognised by their short, rounded bare abdomen.

‡ Except in a few non-Oriental genera.

flattened, thinly harred, but with some strong bristles towards sides, 2nd vein generally with a strong loop near tip, head generally as wide as thorax (Four posterior cells, anterior cross-vein often sloping)

LOMATIINA, p 255.

The exact limits of the subfamilies is still to some extent a matter of opinion, as is also the location of certain genera. Williston ignores subfamilies altogether, and Verrall discusses their affinities in some detail.\*

### Subfamily ANTHRACINÆ.

Head broadly rounded or transverse, closely applied to the thorax, even though the occuput be enlarged; nearly as wide as thorax. Three ocelli. Eyes widely separated in both sexes; from often barely narrower in of than 2, and often with an indentation in the middle of the hind margin. Proboscis porrect, short, rather thick; palpi inconspicuous, labella of moderate size. Antennæ widely separated at base, short, never elongate, 3rd joint conical or onion-shaped.

Thorax barely arched, oblong or nearly quadrate, with rounded corners, moderately or often densely pubescent. No bristles on dorsum, but presentural, supra-alar, and post-alar bristles frequently present, mingled with the pubescence Scutellium semicircular, usually similarly clothed to the thoracie dorsum, sometimes with conspicuous bristles (Hyperalonia, Exoprosopa); metanotum usually hidden.

Abdomen a little longer than the thorax, slightly arched, generally approximately oblong, not infrequently obconical, but never tubular or depressed, usually with sparse or dense pubescence like the thorax, often with bands of scales on some of the segments and at the extremity or underside, and frequently with bunches of such scales or thick scale-like hairs at the basal corners.

Legs moderately long, comparatively slender, femora often with small spines on lower side; tibis nearly always with rows of small spicules and an apical circlet of small spines; tarsi with the joints more distinctly defined in some genera than others; pulvilli small or absent; ungues with or without a small tooth at the base.

Wings with prefuca long, extending nearly or quite to anterior cross-vein, the 2nd longitudinal vein originating in a knee-shaped angle, the 3rd vein being in a straight line with the prefurca. Auxiliary vein long; 1st longitudinal vein long, 2nd vein often forming a loop towards its tip, as does often the upper branch of the always forked 3rd vein. Two, three, or sometimes four (Hyperalonia) submarginal cells; † three or four posterior cells,

<sup>\* &#</sup>x27;British Flies,' v, p 478.

<sup>†</sup> An additional veinlet adventitiously or specifically sometimes causes five submarginal cells

the first usually open, this character not being of generic value. Upper branch of 5th vein forming a considerable portion of lower side of discal cell, the contact occasionally only punctiform. Anal

cell always open to wing-border.

This subfamily is easily recognised from all others by the comparatively long prefurca and the sharp angle at the base of the 2nd longitudinal vein. The body is flattened and broad, the eyes well separated in both sexes, and the antennæ comparatively wide apart at the base.

#### Table of Genera.

1. Four submarginal cells. Three submarginal colls Two submarginal cells 2 Third antennal joint elongate conical, with terminal style bearing microscopic Third antennal joint short omou-shaped, with styliform prolongation bearing a distinct pencil of hairs at tip 3. Third antennal joint short onion-shaped (sometimes more conical), with styliform prolongation always bisected near tip, and bearing an apical pencil of hairs . Third autennal joint forming a style-like cone with microscopic apical bristle, no pencil of hairs ... 4 Contact of discal cell with 3rd posterior not greatly longer than with 4th pos-Contact of discal cell with 3rd posterior at least twice as long as with 4th, the latter contact sometimes merely punctiform

Hyperalonia, Rond, 2. [p. 178.

[р 189. Ехорповора, Масц,

[p. 215] Spogosinium, Macq.,

[p. 214 Argyramæba, Sch,

[p. 232. Lepidanturax, OS.,

ANTHRAX, Scop., p. 284.

Several authors have endeavoured to split up some of the above genera, but such groups must be adopted with much caution.

When Osten-Sacken wrote on Hyperalonia in the 'Biologia Centrali-Americana,' his knowledge was admittedly confined practically to North and Central American species, and though Verrall, possessing the late Mr. Bigot's collection, in which numerous exotic species of both this genus and Ecoprosopa are represented, includes the character "claws not toothed near the base" as generic in Hyperulonia, and "claws toothed near the base" in Ecoprosopa, I am compelled to omit it as being incorrect. In three species of the former gonus (chrysolampis, sphinx, and suffusipennis) a pair of perfectly distinct teeth are present on the posterior tars, and they are present, though small, in tantalus. In some other species they are absent, though I have not examined specimens of all the species available. It may be observed that Loew, in his treatise on the South African species, noted that some species of Exoprosopa had this tooth at the base of the ungues. but declined to regard it as a generic character. In those species of Exoprosopa that I have specially examined for this character the

teeth are present The development or otherwise of the pulvilli in Argyrameba and Anthrax is likely to be inconstant, as it is hard to believe that species of an intermediate nature do not exist. After a more critical study of the species in this subfamily at my disposal and an examination of additional specimens, it has been possible to offer improved descriptions of some of my own species.

#### Genus HYPERALONIA, Rond.

Hyperalonia, Rondam, Archiv. Zool. Modena, 111, p. 57 (1863); Osten-Sacken, Biol Cent-Amer, Dipt. 1, p. 89 (1886), Brunetti, Rec Ind Mus. 11, p. 438 (1909) Velocia, Cognillett, Can. Ent. xviii, p. 158 (1886).

GENOTYPE, according to Coquillett (1910), "Stomoxys morro, F. (Anthrax erythrocephalus, F), the 5th species, by present designation."

This genus differs from the other genera by having four submarginal cells; in some non-Oriental species even five are present. There are also four posterior cells—Further general characters are: the face moderately projecting; the third antennal joint forming an elongate cone with a distinct suture demarcating it from the style, which latter is nearly as long as the cone, with a minute appendage at its tip. The posterior legs are as strong as in Exoprosopa, the fore tarsi indistinctly jointed, without stronger bristles, but with delicate erect hairs on both sides; ungues minute.

Range. South Europe, Asia, North and South Africa, Australia, and North and South America.

As regards the Indiau species of Hyperaloma, the general plan of chætotactic bristles is several on the humeral calli (of different lengths), a few prealar ones and about four very powerful spines on the posterior calli, directed backwards, whilst there is always a row of strong bristles on the hind margin of the scutellum

The vestiture of the legs consists generally of closely applied scales on the femora (often less easily discerned on the middle pair) and at least on the posterior tibie, being most conspicuous on the hind pair. The front legs generally bear soft pubescence only, the posterior femora and tibie with a row or rows of bristles.

One species, *H. flaviventris*, Dol., is described at additional length for the purpose of emphasising the generic characters.

## Tuble of Species.

Wings dark blackish brown, without any considerable clear or maily lear part; the clear part confined to a well-defined limited space in trists and dives only.
 Wings with apical part and a considerable portion of the posterior half, wholly or practically clear, but without any clear line of demarcation

2	Wings very dark brown, but always with a single limited clear space . Wings very dark brown, violet-tinged, no clear	3
_	spaces whatever, in one species wings mo- denately dark smoke-brown	<b>4.</b> 6
3.	Hind margin of wing narrowly clear, remainder of wing wholly dark Wing-tip rather broadly clear, remainder of	dives, Walk, p. 180.
4	wing wholly dark, 2nd posterior cell much broader at base than tip. Wings uniformly very dark blackish brown,	tristis, Wulp, p 180
	cell much broader at base than tip (except in semifuscata).	5.
	Wings very dark blackish brown, fading to dark grey towards hind border; 2nd posterior cell not greatly wider at base than tip	[p. 186. aurantiaca, Guér,
_	Wings moderately dark smoke-brown (variable), 2nd posterior cell much broader at base than tip	sphini, F, p. 187
Ð	Median stripe of pubescence on venter white, autenne all black Median stripe of pubescence on venter yellow,	tantalus, F, p 181 [p 182
6.	1st autenual joint reddish brown.  The 2nd posterior cell slightly narrower	ch ysolampis, Jaen,
	at base than trp, wing colour fading gradually from costa to hind margin  The 2nd posterior cell nearly twice as wide	[p 188. semifuscata, Brun.,
77	at base as at tap; wing colour pale grey, with small darker suffusions	[p. 188. suffusipennis, Bin,
. 7.	Median stripe of pubescence on venter bright reddish yellow, antenno ied-brown	[p. 183] flaviventi is, Dol,
•	Median ventral stripe of pubescence snow-white; antenne all black	enomaus, Rond.,
	Mhanail the about town adouted on the force	acing table may be

Though the characters adopted in the foregoing table may be somewhat difficult to follow, especially by the mexperienced student of this family, they are actually more reliable than any drawn from the coloration of the body or pubescence, and moreover are much more lasting The following further notes may prove of assistance in separating these closely allied but perfectly valid species, of nearly all of which I have seen more than one example Of the ten species in the table, only the last two, flaviventris and amomaus, have any considerable extent of clear or practically clear surface of the wing, this being confined to the apical and posterior portions, and without any clear-cut line of demarcation, the dark part of the wing being the base-costal band so common in Antimacina Secondly, of the remainder, tristis and dives have wholly dark wings, except for a very definite and clearly-cut pale space, in the former at the wing-tip, in the latter on the hind border.\* Of the remaining species, tantalus, chryso-

\*As regards dives. Walker is my authority, because if the clear part is not so sharply defined as he says, the species will fall into the group containing flaviventris and amonaus, and a doubt as to its exact identity may then arise.

lampis, and awantiaca stand out by the deep blackish brown, violet-tinged wings, and of these the latter has a strikingly marked abdomen, whilst the other two are quite definitely separated from one another by the colour of the stripe of pubescence on the belly. H. sphine, F., has wings of a smoky-brown shade that is not easily confounded with the violet-brown of the species of the tantalus group, whilst the two remaining species, semifuscata and suffusipennis, have dark grey wings, and are somewhat easily recognised.

As regards H purpurara, Walk. (Anthraa), recorded in Van der Wulp's catalogue from East India, it is probably not Indian. Walker described it from Java, but it has not been recorded since,

and the specimen is not in the British Museum.

### 133. Hyperalonia dives, Walk.

Anthrax dives, Walker, List Dipt Brit. Mus. 11, p. 40 (1849).

J. "Head black, with an orange-tawny tuft above between the eyes, which are dark red, there are also a few tawny hairs about the mouth, which, like the feelers, is black; chest brown, clothed with short brown and a few long black hairs, and adorned with a fringe of orange-tawny along the fore border and along each side. breast brown, having also a fringe of orange-tawny hairs along the fore border, and some hairs of this colour extend into the disc and mingle with the long black hairs that clothe it; scutcheon ferruginous, beset with stout black hairs and on the hind border with long black bristles; abdomen black above, clothed, especially towards the tip, with brown hairs and adorned along each side with orange-tawny hairs; these latter are most thick at the base, and there they slightly extend across the back; a band of white hairs occupies nearly the whole breadth of the 3rd segment, the tip of the abdomen and the whole of the underside are also clothed with orange-tawny hairs, legs ferruginous, clothed with short black hairs; hips, knees, and feet black; wings dark brown at the base and along the fore border till near the tip, the outline of this colour is regular and very oblique, and runs nearly to the base in a line almost parallel to the hind border; rest of winer colourless, veins black; poisers piceous.

"Length of body 8 lines, of the wings, 18 lines Sylhet."

Type in the British Museum.

# 134 Hyperalonia tristis, Wulp.

Exoprosopa tristis, Wulp, Tijd. v Ent. xi, p 107, pl. iii, fig. 11 (1868)

3. Head with frons not much narrower at vertex than above antennes, where it is distinctly less than one-fourth the width of the head; blackish, with black hairs only on upper part, but with very small narrow yellow scales as well as black hairs on lower part; face reddish orange, the colour encreaching for a little distance on

the frons along the eye-margins, clothed with stiff black hairs and small yellow scales and some short bright yellow hairs around the yellowish month-opening, proboscis black; antennæ black; occiput black, with small yellow scales, at least near eye-maigins, probably extending much further hindwards also, with a fringe of yellow hairs on the hinder margin. Thoras dark olive-brown, nearly black, anterior margin with thickly placed, long orangeyellow scales; a bunch of reddish-orange scales below the shoulders, and also apparently in the same places as they occur in H. flaviventris. short yellow hairs above the wings and on hind margin of dorsum, posterior calli reddish brown; scutellum redbrown, base more or less black, hind margin with short yellow hairs, macrochete of thorax and scutellum as in H flaviventris. Abdomen black, with a slight violet tinge, a bunch of elongate orange scales at sides of 1st segment and traces of a few silverywhite scales on 6th towards the sides, venter black, with some scale-like yellow hairs and much longer fine yellow hairs, forming together a median stripe, genitalia very dark brown, shining, knob-like, with a row of spines at tip. Legs dark yellowish brown; femora and tibie with small bustles, strongest on hind tibiæ; femora with closely applied small concolorous scales. Wings rather dark brown, outer fourth of marginal cell and the three outer submarginal cells wholly or nearly wholly pale grey; alule and alar squame with a fringe of dark brown scales, halteres blackish brown, tips of knobs paler.

Length, 11-121 mm.

Redescribed from one of in the Indian Museum from Tenmalai, Travancore, 22 xi. 1908 (Annandale).

## 135. Hyperalonia tantalus, F.

Anthrar tantalus, Fabricius, Ent. Syst iv, p. 260 (1794), Wiedemann, Auss Zweifl. 1, p. 255 (1828); Macquart, Hist. Nat. Dipt. 1, p. 401 (1834)

Evoprosopa tandalus, Macquart, Dipt Exot ii, 1, p. 37 (1840); Kertész, Kat Pahearc. Dipt ii, p 169, de Meijere, Tijd. v. Ent. 1, p. 230 (1907).

Hyperaloma tantalus, Rondom, Ann. Mus. Genova, vn, p. 453 (1875); Brunetti, Rec. Ind. Mus. n, p. 438 (1909).

Anthi a. caruleopennis, Doleschall, Nat. Tijd. Ned. Ind xiv, p 400, pl. ix, fig. 2 (1857).

& \$\mathcal{L}\$ . Head with from barely one-third the width of the head above antenno, narrowing to two-thirds of this width at vertex; black, with black hairs on upper part, and with black hairs mixed with yellow scale-like hairs on lower part, face reddish brown, with a blackish median longitudinal stripe, irregular in extent; mouth-border varying from reddish brown to yellowish white; probose and palpi black, concealed; antenno wholly black; occiput black, with small yellow depressed hairs. Thorax black, with black pubescence, bearing bright orange or yellowish-orange scaly hairs on anterior margin and in bunches and patches as in

H. flaviventris and chrysolampis, and yellow hairs above wing-base and on hind margin of dorsum; maciocheta as in those species; posterior calli reddish brown. Scutellum reddish brown, base more or less black, with black pubescence and with a row of spines and short yellow hairs on hind margin. Abdomen almost entirely as in H. chrysolampis, but the silvery-white scale-spots on 6th and 7th segments more elongate, nearly attaining the side-margins, a median ventral stripe of small whitish scaly hairs, no yellow hair whatever being present, genitalia concealed, yellowish brown, with black bristles in 3, and yellowish with an apical circlet of short black spines in \$\mathbb{Q}\$. Legs black, sometimes a very dark brown tinge to the tibie; vestiture as in H. chrysolampis. Wings very dark brown, with a violet tinge, aluke, alar squame, and halteres as in H. chrysolampis.

Length, 13-16 mm.

Redescribed from several specimens in the Indian Museum

Ranjitsing, Darjiling Distr; Khatgodam, Naim Tal Distr., 23 ix. 1915; Katmandu and Soondrijal, Nopal; Sadiya and Sibsagar, Assam; Tranquebar, Tenasserim, Sumaira; Java; Berlinhafen, Papua, Borneo, Celebes; China; Japun.

Type in the Wiedemann collection.

### 136 Hyperalonia chrysolampis, Juen.

Exoprosopa chrysolampis, Jaennicke, Abh. Senck. Nat. Geg. vi, p. 344, pl. xhu, fig. 8 (1867)

Hyperaloma chrysolampis, Brunetti, Rec. Ind. Mus. ii, p. 439 (1909);
de Meijere, Tijd. v. Ent. hv, p. 295 (1911)

of Q. Head with frons barely one-third width of head above antennæ, narrowing to two-thirds of this width at vertex; dark olive-brown, with short black pubescence, with which is mixed on the lower half small bright yellow scale-like hairs, ocellar triangle small, reddish brown, face darker, blackish, more or less reddish brown along inner margin of eyes, clothed with more bristly black hairs than the frons, and yellow scale-like hairs; mouth-opening with short yellow hairs; proboses and palpi black; 1st automal joint reddish brown, 2nd and 3rd black, two basel joints bristly, occiput with short yellow hairs, its hind border with a fringe of similarly coloured hairs. Thorax black, with short black pubescence, thick bright orange-yellow scale-like hairs on anterior margin, and bunches or patches of concolorous hairs situated as in H flaviventris, a few short yellow hairs above the wing-base and on hind margin of dorsum; sides and lower part black, scutellum black, with posterior part more or less dull reddish brown, black pubescent, hind margin with short yellow hairs and a row of spines. Macrochata as in II. flaviventris. Abdomen black, with short black depressed pubescence; 3rd segment with a distinct basal band of small silvery-white narrow scales, which is narrowest in middle, and more than half the length of the segment towards the sides; a basal spot of similar

scales on each side of the middle on 6th and 7th segments, at sides of 1st segment a bunch of bright orange elongate scales, sides of the remaining segments with long black bristly pubescence. Venter blackish, with very short black pubescence, towards middle of hind margin of most of the segments are some small bright yellow scales and a median band, not attaining tip of abdoinen, of long, fine hairs of similar colour; genitalia concealed, apparently much as in H. flaviventris Legs black, fore femora and tibie with soft pubescence, posterior pairs with black bristles; all femora with closely applied minute black scales, tarsi with short black pubescence, general vestiture of legs much as in H. flaviventris Wings wholly dark brown, with a distinct violet tinge, alulæ and alar squamæ as in H. flaviventris; halteres dull brown.

Length, 13-20 mm.

Redescribed from several specimens in the Indian Museum · Sikkim, Bhim Tal, 22-27. ix 1906 (Annandale), Java, Kina Balu, Borneo, Moluccas.

Type in the Frankfort Museum.

Jaennecke's original description of this species is wonderfully accurate. It may be recognised by the trio of characters, the red 1st antennal joint, the yellow stripe of hairs on the venter, and the wholly black legs.

### 137. Hyperalonia flaviventris, Dol.

Anthrav flaviventi is, Doleschall, Nat. Tijd. Ned Ind. xiv, p. 400 (1857)

Hyperaloma flaviventris, Osten-Sacken, Berl Ent Zeits. xxvi, p 112, Brunetti, Rec Ind. Mus 11, p. 441 (1909)

of Q. Head with from above antenno one-third of the width of the head, narrowing to half this width at the vertex, dull mouse-brown, clothed with rather numerous short erect black hairs, with some small narrow yellow scale-like hairs intermixed, the latter preponderating on lower part; ocellar triangle dull reddish brown; face orange, liberally besprinkled with short black hairs and some soft golden-yellow hairs around mouth-opening; lower part of head immediately below eyes (where it joins the occiput) yellowish white, bare Antenno reddish brown; 2nd joint barely half as long as 1st, both with black brisiles; 3rd joint elongate conical, bare, nearly as long as 1st and 2nd together, and with a style three-fourths as long as the joint, bearing a microscopic apical appendage Proboscis blackish brown, with large reddish-brown labella, slightly pubescent. Occuput much puffed out, mouse-brown, covered with small narrow bright yellow scales or scale-like hairs, closely affixed; posterior edge o occiput with a fringe of light yellow hairs. Thoraw blackish, with sparse short blackish hairs; anterior margin with dense, long, narrow, bright fiery reddish-orange scales, and dense bunches of similar orange scales or scale-like bristly hairs occur below the

anterior margin, on the mesopleure and metapleure, and below the posterior calli; while short bristly concolorous hairs occur above the wing; humeral calli greyish, with some long black hairs, some powerful black spines in front of and above the wingbase, posterior calli brownish, with short black liners and about six powerful black spines directed posteriorly, scutellum reddish brown, with soft short black pubescence and a row of slightly curved black spines on hind margin. Abdomen black, with short black bristly depressed pubescence; 3rd segment nearly covered from the base with small yellowish-white scales, 6th and 7th segments with similar though narrower bands. A bunch of long narrow reddish-orange scales at the sides of the 1st and the base of the 2nd segments, and coarse bristly concolorous hairs extending along the sides of all the segments to the tip, where they are continued across the posterior margin of the last segment; ground-colour of 2nd segment a little dull reddish brown at the side; venter brownish grey, hind margins of segment with short yellow scale-like hairs; there is also a more or less distinct median stripe of much longer similarly coloured hairs, and a few of such longer hairs are scattered irregularly over the surface. Genitalia bright orange, placed sideways, with yellower parts; an oblong dorsal plate with rounded, rather projecting, carmine-tinted hind corners, a pair of claspers and an upper tubular piece are apparent, all with yellow pubescence, but the whole organ is withdrawn considerably Legs with coxe blackish grey, with some stiff black bristles, especially on hunder pair, and a few reddish-orange hairs; femora and tibiæ terruginous, tarsi blackish; femora covered with small closely applied yellow scales, and with tiny black bristles, the fore pair with a moderate amount of longer soft black hairs, the posterior pairs with a row of obvious black spines of moderate size below; fore tibin with a few closely applied yellow scales, black pubescence, and a few bristles; middle and hand table with more obvious scales and distinct rows of short black bristles, both scales and bristles stronger, and the former more outstanding on the hind pair, tarsi with very short bristly black pubescence. Wings clear, hyaline, ribbed; a poworful curved black spine at base of costa, which latter as far as the humeral cross-vein is closely set with short black spines, as well as the upper basal corner of the wing-surface itself; vonation normal, veins reddish brown, an oblique dark brown band extends from the tip of the auxiliary vein (though the colour fills out the subcostal cell to us tip) to the anal border of the wing, embracing the anterior cross-vein, basal half of discal cell, 2nd basal cell wholly, basal half of anal cell and less than basal half of axillary cell, the limitation of the colour approximately parallel with hind border of wing; anal angle distinct, with fringe of dirty brownish elongate scales; alar squame large and compact, with a similar fringe of longer brownish-yellow elongate scales: halteres brownish yellow.

Length, 13-20 mm.

Redescribed from 3  $\sigma$  and 2  $\varphi$  in the Indian Museum in andifferent condition, the characters drawn mainly from a  $\sigma$  from Mergui, Tenasserim, Trivandrum, S. India; Amboina

### 138. Hyperalonia conomaus, Rond.

Hyperaloma anomaus, Rondani, Ann Mus. Gen. vii, p. 453 (1875); Brunetti, Rec Ind Mus. ii, p 442 (1909).

of Q. Head with from (slightly narrower in of than Q) and face dark mouse-brown or blackish, with black hairs on upper part of former, and the same, mixed with thin scale-like yellow hairs, on rest of frons and on face; frons in 9 only a little narrower at vertex than above antennæ, where it is distinctly less than one-third the width of the head, face sometimes a little redush at margins, mouth-opening from reddish brown to pale brownish yellow; proboscis dark brown, antennæ black or nearly so, sometimes tinged with dark reddish brown; remainder of head Thorax black, with black pubescence, as in *H. flaviventris*. adorned with orange scaly pubescence and bristles as in H flaviventres, scutellum black, posterior half more or less reddish brown, vestiture as in II. flaviventris. Abdomen black, with black pubescence; a bunch of long orange-yellow scales at sides of 2nd segment, and from thence to the tip the sides with coarse black bristly hairs; 3rd segment with a transverse band as in Il flavmentris, but the colour of the scales graduates from yellow (in the median line) to white (towards the margins of the segment), the 6th and 7th segments each bear a pair of white or yellowish-white scale spots, which are more remote from each other than in H chrysolumpis and nearer the edges of the abdomen In the of the whole dorsum of the 5th, 6th, and 7th segments is covered with silvery-white scales. Venter black, 2nd and 3rd segments covered nearly to the side-margins with small whitish scales, and these scales continued in the median line only on the next two segments; over the four segments is a median stripe of fine long white hairs; genitalia apparently as in other species, placed completely sideways in d. Legs very dark brown, almost black, vestiture as in allied species Wings in 2 nearly clear, with the dark oblique band with a less well-defined margin than in H. flaviventris, running irregularly from tip of 1st longitudinal vein, passing well beyond anterior cross-vein to anal angle of wing, thus filling the inner submarginal cell and the 2nd basal cell, and half filling the discal, anal, and axillary cells; 2nd posterior cell about as wide at base as at tip. In one specimen the brown band fades away more gradually and extends further In the & the hinder limit of the dark colour is posteriorly. practically straight, the discal half (diagonally) of the marginal cell is clear, as is also the 1st submarginal cell, except at its base; the clear part of the wing is more hyaline in the d. Length, 13-15 mm.

Redescribed from a & from Peshoke Spur, Darjiling Distr (Lister); 3 & & from Rungpo, Sikkim, 1400 ft, 6 ix. 1909; 2 & & from "Sikkim", 1 & from Mergui, and two & & from Sadiya—all in the Indian Museum; Sarawak, Philippines.

Type in Genoa Museum

#### 139 Hyperalonia aurantiaca, Guér.

Anthrax auranticae, Guérin, Icon. Règne Anim in (Ins.), p. 539, pl. xcv, fig. 6 († 1843).

Huper alonia auranticae, Brunetti, Rec. Ind. Mus. u, p. 440 (1909).

Head with from a little narrower on vertex than above antenna, where it is barely one-third the width of the head, dark olivebrown with black pubescence, intermixed with small narrow bright yellow scale-like hairs, which are most numerous on the lower part; face yellowish, becoming pale creamy white about mouth-opening and on lower part of head; rather closely covered with similar yellow pubescence to that of the from, but more hair-like, especially round the mouth-opening, proboscis as long as height of head, blackish brown, with a few whitish hairs, antennie black, 1st and 2nd joints bristly; occiput black, with short yellow scale-like hairs around eye-margins. Thorax black, with bright yellow pubescence as in H. sphina, paler hairs on sternopleuræ; posterior calli dark reddish biown; scutellum dark reddish brown, blackish at base, covered with short yellow hair, and the usual marginal row of spines. Abdomen black, with black pubescence, clothed almost entirely with yellow scale-like hairs, which are apparently absent from a broad median space from base to tip, a bunch of concolorous elongate scales at each side of base of abdomen, and a patch of silvery-white scale-like hairs at each side, contiguous to the margins, of the 6th and 7th segments; sides of abdomen with coarse black hairs. Venter black, with silvery-white scales; almost wholly covering 2nd and 3rd segments and continued broadly in the median line over 4th and 5th segments, a median line also of sparse long fine white hairs, genitalia concealed, apparently normal. Legs very dark brown, nearly black, coxe ash-grey, with long pale yellowish hairs and some strong long black spines, femora and tibic with small olosely applied grey scales, difficult to perceive on middle femora and fore tibiæ, fore femora and tibiæ without obvious bristles, but these are present on posterior femora and tibiæ; tarsi black, Wings moderately dark brown on anterior half, the pubescent colour fading to grey posteriorly, with a violet indescence in certain lights, sometimes the discs of the cells on the hinder half of wing a little paler; 2nd posterior cell distinctly wider at base than tip, halteres brownish yellow; alar squamæ with a fringe of long yellow scales.

Length, 11-13 mm.

Redescribed from a perfect 2 from Siripur, Saran, North Bengal, 25.1x 1910, it occurs also at Chapra, Bengal (Mackenzie).

### 140. Hyperalonia sphinx, F.

Bibro sphine, Fabricius, Mant Ins 11, p. 329 (1787)
Anthrax sphine, Fabricius, Syst Antl. p. 126, Wiedemann, Auss
Zweifl 1, p. 258 (1828), Macquart, Dipt Exot 11, 1, p. 37 (1840)
Hyperaloma sphine, Brunetti, Rec Ind. Mus 11, p. 440 (1909)

Q. Head with from not greatly wider above antennæ, where it forms one-third of the width of the head, than at vertex; dark reddish brown, face of similar colour, both closely covered with short elongate bright vellow scale-like hairs, some broader concolorous definite scales near eye-margins below antennæ, and some concolorous soft hairs around mouth-opening, which latter is pule yellowish white; from with black bristles from vertex nearly to antenno, proboscis dark brown; palpi elongate, filiform, pale yellow, with a few concolorous hairs, antennal 1st and 2nd joints yellow, 1st with rather long yellow hairs, 2nd with a row of small black spines above at tip, 3rd joint black; occiput blackish, with small depressed vellow hairs. Thorax and scutellium dark reddish brown, dorsum of both, with the humeral calli, wholly covered with close bright yellow scale-like hairs, anterior margin, mesoplemæ, sternopleuræ, and metapleuræ covered with dense yellow elongate scales; a bunch of similar scales just below posterior call; some isolated long black hairs on anterior part of dorsum and about hind margin; three or four powerful black spines in front of wing-base, and four exceptionally strong ones on each posterior callus, directed backwards Abdomen dull dark reddish brown, covered with short black bristly hairs and short yellow scale-like hans, and with rather thick longer concolorous hair at sides, a bunch of concolorous elongate scales at sides of 1st segment, venter lighter reddish brown, with a moderate amount of rather long yellow hairs placed mostly towards hind margin of segments Legs rather bright terruginous; femora and tibio with closely applied small elongate pale yellow scales, sometimes not readily discernible on middle femora, and apparently absent from apical part of fore femora; middle femora rather broadened and flattened vertically, with several distinct short black spines near tip on front side, front femous with soft yellow hairs, both front and middle femora with a few small black bristles, hind pair with rows of black bristles of moderate size below; tarsi black, with normal pubescence. Wings uniformly smoke-grey, sometimes with a slight yellowish-brown tinge and a similar fringe at base; 2nd posterior cell twice as wide at base as at tip; alule with a fringe of clongate smoke-grey scales; alar squame with a similar fringe of yellowish scales; halteres small, bright tawny yellow.

Length, 9-12 mm.

Redescribed chiefly from a perfect Q in the Indian Museum from Puri, Orissa, 16-20 viii. 1911, and an example from Bulsar, Bombay, 20. vi. 1904, near Bombay City, 21. iii. 1905, on seaweed; Chapra, Bengal; Chandipore, Orissa Coast, 3-7. vi. 1915

(Gravely); Trivandrum, 13. xi. 1908 (Annandale); Combatore, S. India, 29. vii. 1912, Colombo, 1 vii. 1904 (Brunetti), vii. 1894 (E. E. Green); Trincomali, 17. vii. 1890 (Col. Yerbury).

Types in Fabricius's and Wiedemann's collections

### 141. Hyperalonia suffusipennis, Brun. (Pl III, fig. 1)

Hyperalonia suffusipennis, Brunetti, Rec Ind. Mus 11, p. 462 (1909).

Head with vertex dark grey to blackish; from orange, paling gradually to the yellow face, or face also all orange, both with elongate chrome-yellow scales, with black hairs intermixed on upper part of frons; lower part of frons and the face with vellow pubescence, mouth-opening with pale yellow hairs, proboscis blacksh brown; palpi long, thin, yellow; antennæ orange-red, 1st and 2nd joints with bristly yellow hairs on each side and some short black bristles above, 3rd joint black. Thorax black, with rather thick short yellowish depressed hairs on dorsum, and thick long bristly whitish hairs below the wings, elongate yellowish scales thickly on anterior margin, below shoulders, and on posterior call, scutellum tawny brown, with short thick vellow hairs and a row of stiff long black spines on posterior border Abdomen blackish, dark reddish towards the sides of the 2nd and 3rd segments; dorsum covered with moderately thick yellowish scalelike hairs, intermixed with black pubescence, a large fan-like bunch of elongate durty yellowish scales at sides of 1st and 2nd segments, venter with whitish hairs Legs brownish tawny, coxe with whitish hairs, tarsi nearly black. Wings pale grey, darker and more yellowish on anterior margin and at base; a slight but distinct suffusion at nearly all the junctures of the veins and cross-veins, halteres pale vellowish white; alule and alar squame with a thick fringe of yellow scales.

Length, 15 mm

Described from two QQ in good condition, in the Indian Museum, from the Purneah District, India, and one from Jaulasal, Naini Tal Distr, 11. iv 1910, a fourth specimen from Dehra Dun, v 1914 (Chatter jee); and a darker variety from Coorg, S India, 1. xi. 1915 (Hannington).

A very distinct species.

# 142. Hyperalonia semifuscata, Brun (Pl III, fig. 2.)

Hyperaloma semifuscata, Brunetti, Rec. Ind. Mus. vii, p. 266 (1912).

- Q. Head much developed behind eyes; frons one-third of width of head at level of antennæ, narrowing at vertex to half this width, blackish, with yellowish scales and long black hairs; face with brighter and thicker yellow hairs, mouth-border broadly orange-yellow, with yellow hairs; proboscis dark brown, antennæ reddish brown, \* 3rd joint very elongate-conical, with a distinct
  - \* The 2nd and 3rd joints of the antennæ have since turned blackish.

style; occiput blackish, with some pale yellow scales on orbital margin and yellow hairs over the hind border. Thorax black, front part of dorsum and around and below shoulders with thick long bright yellow scales; centre of dorsum with only sparse short vellow and black hairs; below the wing the hairs are nearly white and bristly, behind the wing some long bright yellow scales, some strong and very long black bristles on posterior corners of dorsum, and two or three (or thereabouts) before the wing, some long stiff black hairs on humeral calli; scutellum dull reddish brown, with sparse depressed short yellow hairs. erect short black hairs, and a row of black bristles along hand Abdomen black, with uniformly distributed short black hairs; 3rd, 6th and 7th segments each with a band of small dirty white scales (those of the 3rd more yellowish) occupying the greater part of their dorsal surfaces, the bands on the 6th and 7th segments less conspicuous, sides of 1st and 2nd segments with long scale-like yellow hairs; venter blackish, with yellowish pubescence, the basal part a little paler, with whilish hairs. Legs with coxe black, femora brownish yellow, hind pair blackish towards tips; tibiæ a little darker brown, hind tibiæ and all farsi black, fore temora with some black hairs on hinder side. posterior femora and tibia with rows of short black bristles. All femora and posterior tibio with closely applied yellow scales; the whole of the tibic and tarsi with minute black microscopic pubescence Wings dark grey, the anterior half (about), except at tips, moderately dark blackish brown, the colour insensibly dying away along the veins behind the middle of the wing; halteres yellowish.

Length, 10 mm.

Described from two Q Q from Mahabaleshwar, Satara District, Bombay Presidency, 4200 ft., 13-16. iv. 1912 (Gravely); in the Indian Museum.

# Genus EXOPROSOPA, Macq.

Exoposopa, Macquart, Dipt Exot. ii, pt. i, p. 35 (1840), Brunetti, Itec Ind Mus ii, pp 443, 447 (1909).

Litorhynchus, Macquart, Dipt. Exot n, pt. 1, p. 78 (1840)

Trinaru, Mulsant, Mem Acad Sci Lyon, (2) ii, p. 20 (1852).

Arypospyla, Rondani, Dipt. Ital. Prod. i, p. 102 (1856).

Heteralonia, Rondani, Arch. Zool Modena, iu, (sep.) p 57 (1863).

Defilippia, Lioy, Atti Istit. Veneto, (3) ix, p. 733 (1864).

Arypospyla, Verrall apud Scudder, Nomen Zool. p 32 (1882).

Exoptata, Ooquillett, Can. Ent. xix, p. 13 (1887).

Genotype, Bibio capacina, F. (as pandora, F); by Rondani's designation.

Head approximately semicircular, as broad as or a little broader than the thorax; occiput inflated, often considerably so; eyes moderately approximate on vertex or wide apart; from barely narrower in d: ocelli present; face generally conically projecting,

sometimes convex only, proboscis variable in length, often withdrawn, palpi small, thin Antennæ porrect, short, wide apart at base; 1st joint short, cylindrical; 2nd short, wider at tip than base. 3rd forming an irregular elongate cone, with a longer or shorter style, \* separated from the 3rd joint by a distinct suture, with a microscopic bristle at the tip Thorax quadrate or short oblong, with rounded corners, often with fau-like bunches of distinct scales or scale-like bristly hairs in front, below the humeri, around the wing-roots, on the pleure, and occasionally on other parts; scutellum broad, rather large, generally with bristles on posterior margin; metanotum concealed; thorax and scutellum generally with rather thick pubescence. slightly curved, longer than thorax, but often not greatly so, oblong, in a few species almost obcomical, usually with depressed short pubescence and with transverse bands of scales or scale-like hairs on dorsum and frequently on underside also, the pubescence generally longer and thicker on each side at the base. Legs rather long and always slender, all tibiæ without spinules; taisi nather indistinctly jointed, fore legs shorter, posterior legs stronger and longer, in some species with scaly pulpescence: ungues small, generally with a small tooth at their base; pulvilli absent or vestigial Wings with three submarginal cells; often a short space along the base of the costa with brilliant white or coloured scales, venation otherwise as in Ilyperaloma.

Range World-wide.

It is probable that some of the characters admitted as generic are more or less plastic, such as the distinctness of the tooth at the base of the ungues, which Osten-Sacken claims to be always present, even if very small. He also asserted that the front tarsi are more tapering towards the tip in the c than in the P, and that "the length of the antennal style is variable, usually in inverse ratio to the length of the 3rd joint." His characters were drawn up on North and Central American species, a few European and two Australian forms. I have not ventured to include all these points as definite generic characters.

## Table of Species.

1 First posterior cell closed First posterior cell open †	2. 3.
middle, a narrow brown band in apical	[ p. 102.
Wings yellow at base, with two broad	Jiavipennis, Isruii.,
brown bands, one before, one boyond, the middle	[p. 193, fammea, Brun.,

<sup>\*</sup> Exceptions occur E stupida, Rossi, a European species, has no distinct antennal style, the 3rd joint being a long tapering cone ending in a unicroscopic bustle. Probably there are also other exceptions.  $\dagger$  Often closed adventitiously in E insulate

Ī	a). Wings wholly black or blackish brown, or with a very small clear spot only b) Wings clear, with a broad basal and median transverse band, the latter some-	4.
(	times reaching hind boider, both bands joined on the costa, a somewhat isolated species	las, F., p 191
,	darker marks, with small infuscations, or with base-costal band	5.
(	d). Wings clear, or at most with a very	12.
4.	narrow dark anterior margin	pennipes, Wied., p 197. latipennis, Brun.,p. 198.
5	Second posterior cell twice as wide at base	1 ,
	as tip	lateralis, Brun., p 198
в.	base or wider Base-anterior half of wing considerably	6.
	dark, with or without small infuscations	7
	on the veins in the clear part	7.
	than the pale grey remainder, slight	
	suffusions only on some of the veins	11.
7	Abdominal ground-colour chestnut-brown;	
	antenne yellowish , legs brown , no abdo-	[p. 199.
	minal white scale-spots	annandaler, Brun.,
0	Abdomen and antenne black	8
8	Dorsum of abdomen with white scale-spots Dorsum of abdomen without white scale-	9.
	spots	10.
9	Larger species, 14 mm., antennal style	[p. 200.
	normal	maculiventris, sp. 11 ,
	Smaller species, 8 mm., antennal style as	at7t 201
10	long as 31d joint Clear part of wing with several isolated dark	stylata, sp n., p. 201.
	spots	msulata, Walk , p. 203
	Clear part of wing without any isolated	-
17	dark spots	puerula, sp. n , p. 205.
11.	Scutellum and antenno black, all the abdominal segments with a band of yel-	[p. 206.
	lowish white pubescence	benyalensis, Macq,
	Scutellum and antennæ reddish yellow or	
	brown, the 2nd abdominal segment with	7 7 611 303
10	basal band of whitish pubescence *	brahma, Sch , p. 206.
12.	Length 20 mm Length 7 10 mm.	niveiventirs, Brun., 13. [p. 207.
18.	Antennæ reddish brown; pubescence on	In 207.
	anterior margin of thorax whitish; scu-	
	tellum all black, wing wholly clear;	
	venter with small snow-white scales at	[p. 209.
	bases of segments	vitripennis, Brun.,
	Antennæ black; thorax with bright yellow thick scale-like pubescence, scutellum	
	and notice the breamouned a second	

<sup>\*</sup> After Schuer; E bengatonsis and brahma may possibly be synonymous

vitiea, Big , p. 210.

[p. 211. basifascia, Walk.,

#### 143 Exoprosopa flavipennis, Brun.

Exoprosopa flavipennis, Brunetti, Rec. Ind. Mus 11, p. 405 (1909)

Q. Head with frons and ocelli as in flammea; frons orange, with close short golden-orange hairs; mouth-border yellow; proboscis brown, shorter than the head; eyes reddish brown, bare, with small, uniform facets; back of head reddish orange, bare, considerably prominent, with a narrow fringe of very short bright yellow hairs on the margin of the cavity behind. Antenna orange; first two joints sub-cylindrical, wider at tip, with yellow hairs; 2nd shorter than 1st, 3id joint twice as long as first two together, bare, the upper side quite straight, the underside rapidly narrowing from base to tip, a very distinct cylindrical style at tip. Thorax ferruginous orange, with black dorsum and blackishgrey underside; a fringe of long yellow hair-like scales on anterior margin; a bunch of flery orange-red bristly scale-like hairs on shoulders, and shorter similar ones on the humeral call; the dorsum clothed with moderately close, short orange hairs; several long fiery orange-red bristles, directed backwards on the posterior calli; underside nearly bare, a few blackish hairs here and there. Scutellum orange-red, covered with short, similarly coloured pubescence; posterior margin with a horizontal row of concolorous strong bustles. Abdomen sub-conical; ground-colour black, apparently with short, close, black pubescence. A bunch of elongate orange-red scales at the shoulders of the 1st segment; sides of 2nd segment dull reddish, venter black, unmarked, genital apparatus in one specimen, orange, subspherical, slightly protruding, and apparently twisted to the left. Legs with coxe and femora dark brown, anterior tibie brownish yellow, hind pair black, all the knees pale; tarsi black; fore legs practically bare, posterior ones minutely pubescent and with distinct black bristles, which are stronger on the hind pair; posterior tarsi closely pubescent, with black bristles on underside. Wings with first posterior cell closed some distance before the border; rather more than the proximal half bright orange-yellow, apical part and a narrow border along the posterior margin almost to the base, quite clear, an intermediate dark brown, ill-defined cross-band, commencing at the upper edge of the marginal cell opposite tip

of auxiliary vein, the width of the band being about one-third of the length of the 1st submarginal cell, across the middle of which it passes; continuing across the middle of the closed portion of the 1st posterior cell, the distal half of the discal cell, and the bases of the 2nd and 3rd posterior cells, after which it is narrowed to a streak and tuning, extends towards the base of the wing, separating the yellow part from the clear margin. Alulæ with fringe of dirty grey elongate scales, alar squamæ reddish orange, with a short dense fringe of concolorous elongate scales.

Length, 14-18 mm

Described from two specimens from Pusa, Bengal. One (type) in the Pusa collection, taken 19 iv. 1907; the other in the Indian

Museum collection, taken 25 v. 1906, now partly greasy.

E flammea, Brun, and flavipennis, Brun., are distinguished from all the other Eastern Exoprosopa known to me by the 1st posterior cell being closed at some distance before the border, the 4th longitudinal vein meeting the 3rd before the origin of the anterior branch of the latter (in flammea), or just below it (in flavipennis). They therefore belong to the group for which Rondani established the genus Argyrospyla (emended by Verrall to Argyrospyla), but which the late Baron Osten-Sacken says (Biol. Cent.-Am., Dipt. i, p 78) cannot be sustained, this character in various species showing all stages between a closed and open cell, sometimes even in the same species.

### 144. Exoprosopa flammea, Brun.

Exoprosopa flammea, Brunetti, Rec. Ind. Mus. ii, p. 466 (1909).

Q. Head with entire from and face orange-yellow, covered with short golden-yellow hairs; lemon-yellow round the mouth, with short bright yellow hairs, from at level of antenne onethird the width of the head, narrowing towards vertex; ocelli small, close together in front of the vertex; antenne missing, except 1st joint which is reddish; probosess brown, shorter than length of head; eyes dark reddish brown, facets very small, uniform, occiput brick-red, rather prominent, with sparse short golden-yellow hairs. Thorax concreous; humeral and posterior calli orange-tawny, the latter bearing five or six concolorous spines pointing backwards; the anterior border and shoulders are covered with thick long fiery reddish-yellow bristle-like scales, which are also abundant below the shoulders and behind the wings, the dorsum (slightly denuded) is evidently lightly clothed with short orange-yellow hairs; underside of thorax cinereous, with a moderate amount of orange-yellow hair. Scutellum reddish brown, the posterior margin bearing a row of concolorous strong bristles directed backwards, dorsum with sparse yellowish hairs. Abdomen sub-conical; ground-colour chiefly reddish brown; 2nd segment with a narrow anterior and rather wider posterior band connected by a thin dorsal stripe; a rather wide irregular,

not well-defined black transverse band on 3rd segment, which is repeated less distinctly on the following two or three segments. The extreme posterior boider of all the segments is reddish brown, and the whole dorsum is covered lightly with short, bright orange hairs, which become brightest, longest, and fiery red at the abdominal tip; a bunch of fiery-orange elongate scales at sides of 1st segment Venter concreous, covered with short orange hairs, posterior borders of all the segments orange-yellow. Legs with coxe, femora, and most of the tibix reddish orange. the tibiæ towards the tips (especially the hind pair) and all the tarsi black; the middle femora have a few black short spines below, the hind pair a row of stronger ones, the posterior tibio are beset with short black bristles (longer on the hind pair) and have a circlet of strong black spines at the tip, and the whole legs, especially the tibie and tarsi, are minutely but densely spinose. Wings clear, first posterior cell closed at some distance before the border, the 4th longitudinal vein joining the 3rd halfway between fork of latter and the wing-border. Two broad dark brown bands; base of wing bright orange-yellow, the colour extending across the wing from the costa to (and including) the alula, and reaching distally to just within the two basal cells, the costal cell orange-yellowish, also a spot on and over the discal cross-vein, and another small spot in the centre of the upper basal cell. The first brown band begins in the upper basal cell, which it fills, extending posteriorly, filling the 2nd basal cell and basal fourth of discal cell, thence narrowing to the hind borden of the wing, leaving about the distal fourth of both the anal and axillary cells clear, the second band begins approximately on the costa, blending with the orange colour of the costal cell, fills three-fourths of the 1st submarginal and 1st posterior cells, thence narrowing somewhat, it fills nearly the distal half of the discal cell and terminates distinctly clear of the posterior margin of wing, entering the 2nd and 3rd posterior cells; a small round quite clear spot is in the extreme upper angle of the lower basal cell. A few very short stiff black bristles at the base of the costa, and some short close yellowish-orange hairs on the margin of the alulæ and the orange tegulæ, balteres yellow.

Length, 18 mm

Described from a single  $\mathcal{Q}$  (now headless) in the Indian Museum collection, taken at Pusa, Bengal, 17. iv. 1907, other specimens are from Pusa, 1. v. 1911, at light (Howlett); Pusa, 3. iv 1914, Trincomali, Ceylon, 25. vi. 1891 (Col Torbury)

This species closely resembles E. lar, F., in the shape of the wing-markings.

# 145. Exoprosopa lar, F. (Pl. III, fig. 3)

Bibio lai, Fabricius, Sp. Ins. ii, p. 414 (1781).

Anthiax lar, Wiedemann, Auss. Zweifi. 1, p. 268 (1828).

Anthiax collaris, Wiedemann, Auss. Zweifi. 1, p. 271 (1828).

Walker, List Dipt. Brit. Mus. 11, p. 247, Q (1849).

Litor hynchus collaris, Macquart, Dipt. Exot 11, 1, p 80 (1840)
Anthrav riqueollis, Saunders, Tr. Ent Soc Lond 111, p 59, pl v,
fig. 5 (1841)
Etopi osopa binotata, Macquart, Dipt Exot. Supp 5, p 89 (1855)
Exopi osopa collaris, Brunetti, Rec Ind Mus 11, p 444 (1909).

Head with from distinctly parrower at vertex than above antennæ, where it equals one-third the width of the head, dark nut-brown, with a slight pink or orange tint, covered with short black pubescence, and a few minute elongate pale brownish-yellow scales or scale-like hans on lower part, face of similar colour to from, with black pubescence and similar scales, proboscis dark. withdrawn; antennal 1st and 2nd joints ferruginous, 3rd black. occiput yellowish brown, with minute black bristles, which continue over the vertex nearly to the ocelli; and with whitish scales forming a band of irregular width configuous to the eyemargins. Thorax black, with sparse black pubescence, covered with very short depressed yellowish (almost pinkish) brown scale-like hairs; anterior margin with a thick fringe of very long narrow brownish-yellow (varying to bright ferruginous) hair-like scales, a bunch of similar scales below the humer, on prothorax, and below posterior corners of dorsum; coarse hairs of similar colour cover the mesopleure, with some black hairs intermixed below wing base; sides of thorax dull orange-brown; humeral cally reddish brown, with numerous black bristles, posterior calls reddish brown, covered with pubescence like that of the thorax. with several long strong spines projected hindwards. Scutellum uniformly dark reddish brown, with similar pubescence to the thoracic dorsum; hind margin with a row of spines. Abdomen black, the sides often more or less reddish; posterior margin of 1st segment narrowly, 2nd and 3rd segments from base to tip (covering one-third of the surface on each side) dull but distinct reddish brown, the whole dorsum with short depressed black pubescence; a fan-like bunch of rather dirty white very elongate scales at sides of 1st segment; a patch of long yellowish-white scales towards each side of 3rd segment, contiguous to the margin, and 6th segment (and possibly 7th also) covered with similar scales, the sides of the abdomen from 2nd segment to tip Venter moderately dark brown, with coarse black bristly hair barely tinged with yellowish, but with paler hind margins to the segments and a few soft yellowish hairs; genitalia rather large, Legs reddish brown, metatarsi more or less darker, ferrugmous rest of tarsi black; fore legs, apart from the usual minute pulbescence, with rows of very short bristles on tibie; middle femora with at least two rather strong bristles of unequal length on unner side towards tip; hind femora with a row of stronger bristles below, posterior tibiæ with the usual rows of small bristles; tarsi with short stiff black pubescence below. hest described as pale grey with the basal third dark brown, filling the anal and axillary cells except their tips, the colour continued along the costa nearly to the tip of the 1st longitudinal vein and extending hindwards to the upper side of the discal cell, thence spreading out and embracing the apical third of that cell, the base of the 2nd posterior, and just entering the 3rd posterior, the colour sharply delimited distally by a line drawn from its costal limit to where it ends posteriorly in the 3rd posterior cell; a small clear spot at upper corner of 2nd basal cell, with a small yellowish spot immediately above it, and a slight pale yellowish tinge about the middle of the 1st posterior cell; the brown colour is only very slightly variable in its extent. Alulæ and alar squamæ with a fringe of dirty brown scales; halteres black.

Length, 14-16 mm.

Redescribed mainly from a 5 in good condition in the Indian Museum from Bara Banki, United Provinces, 14 x 1910, and others in less good condition from Kangra Valley or Sikkim (Dudgeon); Allahabad, i. 1910 (Chatterjee); Bandhara, Cent. Prov, India, 1.xii. 1912 (Imms); Sabibganj, Bengal; Bellary, South India, 10. viii -11. ix 1913; Surat, Bombay, 11. xi 1911 (Fletcher), Bangalore, Trivandrum; Mahagany, Ceylon, 15. ii. 1891; Nilavelli, Ceylon, 30. v. 1891 (Col. Yerbury)

Types in Fabricius's, Westermann's and Wiedemann's collections. It inust be remembered that the foregoing description is chiefly from an individual specimen. Wiedemann noted the close affinity between collars and lar, claiming for the former the more fox-red collar, the absence of white tomentum at the tip of the abdomen, the absence of white pubescence towards the sides at the base of the abdomen, the wholly black ground-colour of the body, the black-haired abdomen, and the shortening of the second transveise black band (so to speak) on the wing, so that it does not reach the hind border.

Most of these characters are more or less variable, especially the distance to which the more distal of the two extensions of the costal dark border reaches, and the reddish-brown colour of the sides of the abdomen. Saunders's figure of his rugicollis shows the limits of variation in three characters, the ferruginous collar, the shortened wing-band, and the all-black abdomen. Wiedemann's characters of the absence of white vestiture at the base and tip of the abdomen are negative ones, and it may reasonably be supposed that his specimen was somewhat worn.\*

Two specimens in the British Museum from Mahagany, Ceylon (Col Yorbury), appear to represent an undescribed species allied to E lar, but are not in sufficiently good condition to describe properly.

One of the specimens bears a label "? E binotata, Macq" This latter I concluded † to be synonymous with collaris, Wied,, being further convinced by a specimen of the latter in the Indian

<sup>\*</sup>As the first few examples of this species seen by me answered fully to Wiedemann's collaris, a certain number of specimens were identified by me as such and returned to correspondents. These should bear the name of lar.

<sup>†</sup> Rec. Ind Mus 11, p. 444 ‡ E. collars, Wied., is now regarded by me as synonymous with lar, F.

Museum, labelled "E. bimaculata, Macq" in Bigot's handwriting. Bigot evidently wrote bimaculata in mistake for binotata, but the two specimens described above are certainly distinct from lar. In the event of binotata, Macq., being a good species, they may be representatives of it.

#### 146. Exopiosopa pennipes, Wied.

Inthrar pennipes, Wiedemann, Dipt. Exot. 1, p. 129 (1821), id., Auss Zweifl. 1, p. 272 (1828).

Exoprosopa pennipes, Macquart, Dipt Exot 11, 1, p. 49 (1840); Brunetti, Rec Ind Mus ii. p. 448 (1909).

Hyperalonia pennipes, Rondani, Ann Mus. Gen. vii, p. 452 (1875).

Head with from more than twice as wide above antenna (where it equals one-third the width of the head) as at vertex, blackish, with black hairs on upper part, and below with black hairs mixed with a number of short silvery scales of rather greater width; face black. with black bristly hairs and small silver scales; proboscis vellowish brown; antennæ black, possibly sometimes reddish brown at base; occiput black, with small silvery scales at least near the eyemargins, probably a considerable part of the surface thus covered in perfect specimens. Thorax black, dorsum with a dark indigoblue tinge, caused by the whole surface being covered in perfect specimens with brilliant small subquadrate blue scales, longitudinally striated, black pubescent, anterior margin with long narrow black scales; bunches of similar scales or bristly hairs below shoulders, on mesopleure and metapleure, and below hind corners of dorsum; apparently some black bristly or coarse hairs around the wing-base. Scutellum black, covered with scales like those of the thorax, pubescent, dull dark brown towards hind margin, which bears a row of spines. Abdomen black, covered with blue-green or green scales, with black pubescence, some long, thin, very dark brown scales in a bunch at sides of 1st segment; venter dark blackish indigo, with a little black pubescence and no trace of scales. Legs black; fore tibize and metatarsi yellowish brown; middle tibie very dark brown; hind femora towards tips and hind tibiæ from base to tip with rows of dense long dark brown narrow scales. (No distinct bristles are visible on the legs, but this may be due to the bad preservation of the specimens.) Wings deep brown, violet-tinged, fore border about the middle a little yellowish, also just a little paler about the cross-veins; tip of wing quite clear, limited by tip of 2nd longitudinal vein, and hindwards on the wing-border by the proximal side of the 2nd posterior cell \* Alulæ and alar squamæ fringed with long narrow dark brown scales; halteres blackish brown. Length, 11-18 mm.

<sup>\*</sup> In the second specimen (from Karachi) the wing is pale along the hind margin of the 3rd posterior cell.

Redescribed mainly from a specimen (? 3) from Kohima, Assam, in the Indian Museum; a second specimen from Karachi and other specimens from Pusa, and lower ranges, N. Khasi Hills, 1878 (Chennell).

The Karachi specimen shows the following differences —The 1st antennal joint (the only one remaining) is distinctly reddish brown, there is a bunch of dirty white scales at the sides of the 1st abdominal segment, the abdomen is longer, narrower, and more pointed, the last segment distinctly reddish blown, with the ovipositor protruding considerably, and the venter has indisputable traces of a median row of white scales. The only remaining leg is a hind one, on which the scales are identical with those of the Kohima specimen.

#### 147. Exoprosopa latipennis, Brun.

Exoprosopa latipennis, Brunetti, Rec. Ind. Mus. 11, p 464 (1909).

d Head with from barely one-third width of head at level of antennæ, two-thirds of this width at vertex; dark olive-brown, rather velvety, with a few scattered hairs, lower part and face with small elongate pinkish-yellow scales, ocelli on a minute protuberance on vertex; antennæ blackish brown, underside of head blackish brown, mouth-border narrowly yellowish. Thorax black, with thick bright orange hairs on lateral margins; black bristly hairs on lower part in front; anterior margin and below both shoulders and posterior calls with thick bunches of elongate orange scales; scutellum black, with a row of black hairs or fine bristles on hind margin. Abdomen black, elongated, sides parallel, tip rounded, with sparse black pubescence, sides of 2nd, 3rd, and 4th segments narrowly brick-red, a bunch of pale yellowish elongate scales at sides of 1st segment, sides of abdonien with rather thick yellow hairs, which become thinner and paler towards tip; venter black, with black hairs, central segments paler in middle. Legs dark brown, hind femora with a row of long bristles below. Wings uniformly rich dark brown, unusually wide across the middle.

Length, 18 mm.

The present description is from the type, from Shillong, in the Indian Museum (which is a  $\delta$ , not a Q), and two  $\delta$   $\delta$  in the British Museum (Khasi Hills and Cherrapunji, Assam).

# 148 Exoprosopa lateralis, Brun (Pl. 111, fig 7)

Evoposopa lateralis, Brunetti, Rec Ind. Mus. 11, p. 467, pl. xii, fig. 17 (1909)

Q. Head with from and face dark olive-brown, becoming more or less orange towards the lower part of the latter, both covered with black pubescence and (except the upper part of the froms) with small pinkish-yellow scales; proboscis dark brown, palpi

yellow, antennæ brown, 1st and 2nd joints bristly; occiput dark grey, with yellowish scales around eve-margins. Thorax black, with long bright ferruginous scales or bristly hairs on anterior margin. below shoulders, and on posterior calli, dorsum (denuded) evidently more or less covered with very short yellow scale-like hairs closely applied, which towards the sides and hind margin are thinner and longer; lower part of thorax bare, with ferruginous marks \* Abdomen elliptical; black, the sides more or less broadly brick-red, this coloration is very variable in quantity, as in one specimen it only moderately narrowly borders the abdomen, and in another one it extends so far inwards as to reduce the black part almost to a dorsal row of spots. Bunches of ferruginous elongate scales at each side of 1st and 2nd segments, and a small tuft of stiff black hairs at the sides of each segment; dorsum thinly covered with short tawny yellow scales and black hairs, last segment reddish, black at the middle of the base, venter brownish brick-red. with sparse yellow hair-like scales. Legs (mainly missing) tawny brown . fore coxe with rather long yellow hairs , hind femora and tibiæ with short black spines. Wings dark brown, tip and posterior border nearly to the base irregularly and indistinctly clear, the clear part extending into the discal cell: traces of a small round clear spot in upper corner of 2nd basal cell; alulæ and alar squame with dirty brown elongate scales.

Length, 14-18 mm.

Described from three  $\mathcal{Q}$  in the Indian Museum from Calcutta; and Talewaddi, N. Kanara Distr., 3-10, x. 1916 (Kemp).

### 149. Exoprosopa annandalei, Brun. (Pl. III, fig. 8.)

Eroprosopa anuandales, Brunetta, Rec. Ind Mus. 11, p 469, pl. x11, fig 20 (1909).

Q. Head with vertex, frons, and face blackish, with short sparse yellowish hairs, and some stiff briefly black hairs on frons, which is considerably narrowed on the vertex, where the ocellar triangle is very small, mouth-opening yellowish, proboscis dark brown; palpi black, short, filamentous, with a single row of hairs, antennæ yellowish, first joint hairy, third rather elongated, with moderately long style, back of head dark grey, eyes dark brown, with some yellowish hairs, which are whitish behind the eyes. Thorax blackish, tawny-yellow hairs inther thickly placed on fore border, and on the sides, where there is a pale tawny spot on the pleuræ; dorsum nearly bare (? denuded). Scutellum light brown, posterior border with a row of black spiny bristles and short sparse yellowish hairs; metanotum hidden. Abdomen ovate, chestnutbrown (ground-colour), with a row of irregularly oval dorsal black spots at the base of each segment, and with traces of a narrow black line almost on the posterior borders of some of the segments; a sparse band (interrupted in the middle) of short

<sup>\*</sup> Possibly due to discoloration.

whitish hairs on the anterior part, and a similar band of blackish hairs on the posterior part, of each segment; the second segment possessing a basal row of short sparse tawny hairs and a bunch of longer white hairs on each side at the base, the short whitish hairs on the dorsum may possibly extend over the greater part of the surface, and appear more like scales than hairs. Venter chestnutbrown, with irregular black marks and with short white scaly hairs generally distributed over it. Legs tawny brown, fore coxe similar. posterior coxe blackish brown; hind femora with a few hairs below, posterior tibiæ moderately covered with short bristles: tarsi blackish brown, minutely pubescent below. Wings pale grey. with a dark brown oblique baso-costal band, which has an indentation on the lower side; the brown colour extends along the costa to the tip of the first longitudinal vein, its outer edge extending posteriorly to just behind the second posterior cell, the colour thus filling slightly more than half the first longitudinal and discal cells, and extending in an irregularly straight line from the latter cell to the base of the wing, filling half the anal cell, round brown spots, all of equal size, are placed at the tip of the second longitudinal vein, at the base of the fork of the third longitudinal and at the tip of the vemlets dividing the second, third, and fourth posterior cells; on the upper corner (adjoining the base of the discal cell) of the lower basal cell a small bluish opalescent spot; at extreme base of wings and along the stronger veins a distinct tawny colour, halteres yellowish white

Length, 9-12 mm.

Described from the two original females in the Indian Museum from Moulmein, Lower Burma, 6. iii. 1908 (Annundale).

## 150. Exoprosopa maculiventris, sp nov.

d. Head wholly blackish grey; from about half as wide again at level of antennæ as at vertex, with fine black hairs, intermixed with short yellow ones on lower part, face with sparse short yellow hairs and on lower part with rather short black hairs: antennæ and mouth-parts black; the considerably puffed-out occuput with a few short yellow hairs, and on hind border a narrow fringe of them. Thorax and scutellum black, with moderately short black pubescence, which is longest on the scutellum: anterior border narrowly with short yellow hairs, and a conspicuous bunch of long bright yellow pubescence below each shoulder; some yellow hairs along the sides below the wings and a large bunch below the posterior angles of the dorsum; the posterior calli themselves having a few much shorter and paler yellow hairs on the hinder side. Abdomen black, surface of segments (except 1st) mainly covered with small closely-set black scales, and bearing long fine black hairs, except at base and hind margins, 1st segment dark blacksh grey, unscaled, with short yellow hairs on dorsum and a bunch of long bright yellow hairs

towards and over each side; on the 2nd segment towards each anterior corner is a circular spot of yellowish-white scales; this pair of spots is duplicated on the 3rd and 4th segments, the scales forming them being less yellow on the 3rd segment and nearly white on the 4th, 5th segment bearing no white spots, but 6th and 7th each with a similar pair of white scale-spots; sides of 2nd segment with long yellow hairs anteriorly (as in 1st segment) and black hairs posteriorly; sides of remaining segments with thick black pubescence. Venter black, with small closely impressed black scales and thin black pubescence; sexual organs too concealed for observation. Legs wholly black, with ordinary pubescence, tibix with obvious closely impressed small black scales and two distinct rows of bristles on hind pair, with numerous others more or less arranged in longitudinal rows, hind femora with a little soft black hair and a row of distinct, fairly long bristles on Wings with about anterior half deep blackish brown, the colour filling the marginal cell except the tip, thence running parallel to the hind margin of the wing, filling half the 1st posterior cell, thence retreating, filling barely half the discal cell, thence extending to the hind angle of the wing, filling half the anal and axillary cells An oval spot at tip of 2nd vein, joining the costa and also the extremity of the costal darkening, a spot at fork of 3rd vem, another over the cross-vem joining the 2nd vein, and another over the posterior cross-vein, all the spots concolorous and contiguous to the main expanse of colour. Alar squamo black, with short fringe of bright yellow hair, halteres black

Length, 14 mm.; expanse, 34 mm.

Described from a single perfect specimen in the Indian Museum from Kousanie, Garhwal State, 6075 ft, 22 vii. 1914 (Col. Tytler).

The wing-markings are very nearly similar to those of *E. annandales*, figured in Rec. Ind. Mus 11, pl. xii, fig. 20, except that in this latter species the colour is of a much lighter brown.

### 151. Exoprosopa stylata, sp. nov.

of Mead with from at vertex about two-thirds as wide as at level of antennæ, where it is less than one-third the width of the head; covered with dull brownish tomentum or dust with a tinge of yellow, sparsely beset with stiff black hairs; lower part of froms with depressed black scales, which in certain lights exhibit a silvery lustre; face distinctly produced into a blunt cone, covered thickly with similar black scales (shining silvery) and long bristly hairs as on froms; upper edge of mouth-opening furnished with very long, thin, dark brown scales; mouth-opening and proboscis brown, latter extending forward as far as tip of antennæ. Antennæ black, 3rd joint elongate conical, as long as 1st and 2nd together, with a style as long as the joint itself, bearing a pale elongate thick bristle at tip. Thorax black, faintly shining; at least hinder part with small impressed black scales (which possibly cover the entire

surface), dorsum also with stiff black pubescence of moderate length; anterior margin with a thick fringe of very elongate bright yellow scales projecting forwards, forming a sort of dense collar, shoulders entirely covered with a dense bunch of very elongate black scales, which extend (diminishing in strength) over the mesopleura, and continue as short stiff hairs over part of the sternopleura; pteropleura bare, shining, but the metapleura with a thick bunch of black scales on its posterior part; sternopleura with a slight greyish tinge on lower part. Scutellum black, with minute adpressed black scales covering its entire suiface, and a row of curved black bustles on hind margin. Abdomen black, faintly shining, entirely covered with minute adpressed black scales, which, it viewed at a low angle from in front, show a silvery sheen; and with a row of black bristles on hind margins of at least the last two or three segments, the hind margins of which bear a row of rather short but obvious dark brown scales, the outer twothirds of 1st segment with a dense covering of very elongate, bright chrome-yellow scales, the actual sides with elongate black scales, sides of other segments also with elongate very narrow dark brown scales, and a few other quite broad dark brown ones, intermixed posterioily with black bristly hairs, six spots composed of scales, which, viewed from in front, appear silvery, and from behind dull milk-white, are placed as follows. one towards each side of the dorsum on 3rd segment, one at base in centre of 4th, one towards each side of 6th, and an elongate one at base of 7th extending over the greater part of the segment. Venter covered uniformly with minute brownish-black scales that appear silvery when viewed at a low angle either from in front or behind; a row of bristles on hind margin of each segment. Genitalia rather large, apparently consisting of a small sub-globular reddishpiece and a greyish cone-shaped piece of larger size, pubescent. Legs black, coxe with bristly hairs; femora closely covered with black scales that appear silvery in certain lights; tibia apparently reddish brown, but in certain lights the scales shine silvery; tarsi Wings pale grey, indescent, a brown base-costal band, brown limited distally by tip of 1st longitudinal vein, the hinder margin of the band nearly a straight line thence, through the anterior cross-vein and extreme base of 4th posterior cell, and thence to base of wing, encroaching narrowly on anal cell, discal cell nearly clear, a darker brown spot jointly over tip of prafurca and anterior cross-vein, another over base of discal cell and forking of 5th vein, a small one at base of 3rd posterior cell.

Length, 8 mm.

Described from a unique specimen from Hadagalla, Ceylon (T. Bambrigge Fletcher)

Type in the British Museum, presented by Mr. Fletcher.

The conspicuous silvery-white spots on the abdomen placed like the "5" of a playing card, in addition to the exceptionally long antennal style, render this species easily recognisable.

### 152. Exoprosopa insulata, Walk. (Pl. III, fig 4)

Anth ax (8 g Lator hynchus) insulata, Walker, Ins Saund, Dipt pt in, p 172 (1852).

Eroprosopa visulata, Brunetti, Rec. Ind Mus ii, p. 440 (1909).

Head with from about half as wide again above antenno, where it forms one-third the width of the head, as at vertex, dull olivebrown (in well-preserved specimens, otherwise blackish), with black pubescence and minute elongate pinkish-yellow scales or scale-like hairs, face concolorous, but yellowish about the mouth-opening, with similar hans and small scales, proboscis black, projecting some distance beyond tip of antennæ; antennæ black; occiput dark grey, with very small yellow scales in the neighbourhood of the eye-margins, hinder edge with a fringe of short yellow hairs Thorax dark olive-grey or olive-brown (in perfect specimens), with short black pubescence and very minute elongate yellow scales, which perhaps are sparser about the centre of the dorsum; anterior margin with long brownish-yellow scales, which are also fairly abundant from below the shoulders to below the wing-base, and, again, below the posterior corners of the dorsum part of protherax, the mesopleure, pteropleure, and sternopleure with long black bristly hairs, scutellum concolorous with thoracic dorsum, with small yellow scales and a few black hairs, and a row of rather sinuous thin black hairs on posterior margin rather dull black, slightly shining, 1st segment with a bunch towards each side of comparatively short, very erect, elongate, brownish-yellow scales, and a narrow band of such erect scales extends across the segment on the anterior half, 2nd segment with broad band on anterior half of small elongate closely-applied yellow scales, the posterior half being covered with black scales of similar nature; 4th and following segments with similar black scales on anterior part and yellow scales on hinder part, 4th segment with a patch of silvery-white scales towards each side, and 7th segment mainly covered with such scales, sides of abdomen with long brown scales and long black hairs, venter black, with a little black pubescence and covered with minute yellow scales Legs black, tibue more or less dark brown, femora with small closely-applied pale scales, posterior femora and tibro with the Wings pale grey, with a broad oblique dark brown usual bristles. or blackish-brown band extending on the costa to tip of 1st longitudinal vein, and distinctly beyond bifurcation of 2nd and 3rd veins, and anterior cross-vein, embracing basal third of discal cell and crossing anal and axillary cells about their middles, several blackish spots are present, variable in number and size, four on the clear part of the wing being always present, placed respectively (1) near tip of 2nd vein, (2) at fork of 3rd vein, (3) on 2nd vein at the junction of the veinlet joining this vein to the 3rd, and (4) over outer side of discal cell, generally elongate and sometimes reduced to two separate spots, on the brown part of the wing, the spots being much darker in colour, there are generally one over the anterior cross-vein, one at the fork of the 4th vein, and at the base of both the 3rd and 4th posterior cells; adventitious spots freely occur about the tips of the 2nd and 3rd longitudinal veins, and occasionally in other parts, and the 3rd posterior cell is often more or less bisected longitudinally by an additional incomplete veinlet. The 1st posterior cell is not infrequently closed just before the border. Halteres black.

Length, 7-10 mm.

Redescribed from several specimens, mostly in inferior condition, in the Indian Museum from Soondrijal, Chitlong, Nagorkote, Pharping, and Khumdhik, in. 1909—all in Nepal, Debra Dun, xi 1907 [Lt.-Col. Wyville Thomson]; Naini Tal District, 4. iv. 1910; Mussoorie, ix. 1906, Simla, x. 1911; Allahabad, v. 1911 and xii 1910 (Chatterjee); Bandhaia, Central Provinces, 1 xii 1912 (Imms), Mahagany, Ceylon, 17. i. 1912 (Col. Yeibury), Castle Rock, N. Kanara District, 11-26. x. 1916 (Kemp), Madhupur, Bengal, 16. x 1909 (Paiva); Pipera, Gondo District, United Provinces, 9. iii. 1909, Ootacamund, S. India, 24-31. xii. 1913 (Fletcher); lower ranges, N. Khasi Hills, 1878 (Chennell).

There seems no reasonable doubt of this being Walker's insulata, described originally from the "East Indies." It is common through Nepal and extends to the Indian plans. Walker says the sides of the abdomen are fringed alternately with black and yellow hairs, but this does not appear to be the case, though possibly in perfect specimens the white scales on the 4th and 7th segments may overhang the margin sufficiently to produce this effect. His description also of the wing-spots does not quite agree with mine, but these markings are admittedly

A specimen in the Indian Museum from Dehra Dun labelled "E. S-notata, Big., sp. nov.' is certainly identical, and is apparently merely a MS name; a second specimen with precisely similar markings is from Calcutta.

A further specimen from "Thingaunyinaung to Myawadi," Lower Burma, 900 ft, 24-26.xi. 1911 (Gravely), has the spots in the clear part of the wing all so enlarged and blurred that hardly any grey surface remains.

Some notes of mine on the variation of the wing-markings

appeared recently (Rec. Ind. Mus 11, p. 446).

In comparing the descriptions of insulata, Walk., bengalensis, Macq, and brahma, Sch., it will be seen that they are somewhat similar. The latter I have not seen, but a number of specimens of both insulata and bengalensis in the Indian Museum (both identified by me, but, I think, without possibility of doubt) prove that at least these two are quite good and distinct species. E. insulata is known by the black or deep blackish-brown colour of the basocostal band, which, though not actually clearly defined, stands out if a number of specimens be glanced at collectively; whereas in bengalensis the colour is brown, without any trace of black, and there is no apparent line of demarcation between the anterior half and the posterior half, the latter being only a little lighter.

The spots in *insulata* stand out distinctly, especially those nearest the wing-border; they are black or blackish brown, and some of them are placed elsewhere than on the cross-veins. The "spots" in *bengalensis* are small, moderately light brown infuscations, and occur only on the cross-veins, although the veins themselves are often lightly infuscated for considerable distances. *E. brahma* has distinct spots, apart from infuscations of cross-veins, and should therefore in this character approximate to *insulata*, but Schiner distinctly describes the anterior part of the wing as only smoke-brown. Again, in *brahma* the scutellum and antennæ are reddish yellow or brownish, whereas in both *insulata* and *bengalensis* these parts are black. The presumption is that all three are good species

#### 153. Exoprosopa puerula, sp. nov. (Pl. III, fig. 9)

Head with from distinctly broader at level of antennæ, where it is one-third the width of the head, than at vertex, both from and face blackish, former more or less cinereous grey towards vertex, latter orange yellowish around the mouth, the lower half, or rather more, of the frons and the major part of the face covered with closely-applied yellowish scales and a little fine black pubescence, some vellow hairs about the lower part of the face; proboscis blackish, antennæ blackish grey; occiput blackish, with a considerable amount of dirty white scales, closely applied. Tho ax blackish, thickly covered with very thin yellowish hair-like scales, anterior border with a fringe of long brownish-vellow scales; some long bristly black hairs on lower part of prothorax, pleuræ with bristly scale-like brownish-yellow hairs, scutellum black, about the apical half reddish brown, the whole dorsum (apparently) covered with short yellowish scales like those of the thorax. Bristles of thorax normal. Abdomen blackish, dull, hand border of segments rather narrowly brownsh yellow, the colour spreading out considerably towards sides of 2nd and 3rd segments; the whole dorsum covered with black hairs and closely-applied small brownish-yellow scales, which towards sides of 3rd segment are whitish; a bunch of elongate pale brownish-yellow scales at sides of 2nd segment and a similar bunch of shorter small black scales at sides of 3rd segment. Venter yellowish, marked here and there with black, and mainly covered with small yellow scales black; femora and tibie with yellowish scales and the usual bristly hairs; tarsi black. Wings clear, the dark oblique band running diagonally from tip of auxiliary vein, crossing the centres of the anal and axillary cells, a loop extending from the middle of the 1st posterior cell, along the outer side of the discal cell; the colour also encroaches well into the base of the 4th posterior cell; a pale yellowish spot around the anterior cross-vem and base of 4th posterior cell, a semi-hyaline small spot about the base of the discal cell; halteres brown; clubs dull yellow.

Length,  $4\frac{1}{2}$ -6 mm.

Described from two specimens in the Indian Museum from Madras (Capt. Cragg).

# 154 Exoprosopa bengalensis, Macq. (Pl. III, fig. 5.)

Exoprosopa bengalensis, Macquart, Dipt. Exot. 11, p 49, pl. aviii, fig 4 (1840), Blunetti, Rec Ind Mus 11, p 445 (1909)

3 2. Head with from at vertex half as wide as at level of antennæ, where it is barely one-third the width of the head; dull olive-brown or cinereous, the amount of yellowish tinge variable, whole from and face with black pubescence in moderate amount, also (except towards vertex of former) covered with short narrow yellowish scales, closely applied to the surface, mouth-border brownish yellow, with black hairs; probosers blackish brown, labella narrow, palpi black, thin, with fine black hairs, autennal 1st and 2nd joints brownish yellow, with black bristles, 3rd joint black, occiput blackish, with yellowish scales around eye-margins. Thorax brownish grev, dorsum covered with short coarse yellowish scale-like hairs; anterior maigin with elongate orange-yellow scales, thickly placed, and bunches of similar or slightly paler scales below the shoulders, on the mesopleure, and around and behind the wings; black spines on humeral and posterior calli; scutellum blackish, hind maigin more or less reddish brown, covered with short yellowish hairs and with a low of black bristles on posterior margin. Abdomen blackish (?) or reddish brown, wholly covered with very small elongate vellowish scales and black bristly hairs, a bunch of elongate vellowish scales at sides of 1st segment, venter blackish or reddish brown, with a few long yellow hairs; hind margins of segments more or less pale, with some yellowish scales Legs blackish; femora and tibise with rather thickly-placed, closely-applied, yellow scales, which extend over the upper side of the metatarsi, and apparently occasionally to the remaining joint also; the whole of the legs with black bristles, the tarsi with black pubescence Wings yellowish grey; a slight infuscation over practically all those parts of the veins that he transversely; the veins themselves more or less darkened basally, halteres yellowish, knobs a little darker, alulæ and alar squamæ with a dirty brown and vollowish fringe of scales respectively.

Length, 10-12 mm.

Described from several examples in bad condition in the Indian Museum, labelled "? India"; Hadagalla, Ceylon, ix, x. 1911; Trincomali, 14.1. 1891, and Mahagany, Ceylon, 15. ii. 1891 (Col. Yerbury).

The genitalia are quite hidden, the sex of the specimens is therefore uncertain, and no difference in the width of the frons in any of them is apparent.

Type in the Paris Museum.

# 155. Exoprosopa brahma, Sch (Pl. III, fig. 6.)

Exoprosopa brahma, Schiner, Reise 'Novara,' Dipt. p. 199 (1808).

"Brown; venter and scutellum reddish yellow, latter at base blackish. Whole ground-colour of body can be seen to be pale

brown through the dense pale pubescence. Thorax in front and at sides with longer golden-yellow hairs, in front of and around wing-base with black bristles Abdomen at the base with thick and long golden-yellow hair, 2nd segment on fore border with a whitish-yellow cross-band. Head reddish brown, epistome paler, frons darker, pubescence short, bright golden yellow; froms black on hinder part Antennæ brown, 3rd joint very clongate, gradually tapering and produced into the style. Legs reddish yellow, knees rather darker, tarsi brown; femora with shining scales, all bristles black; pulvilli rudimentary Wings sooty brown, darker on front margin and more reddish, with eight two at base of outer marginal (cubital) cell, black spots two at base of 2nd posterior cell, one each at bases of 3rd and 4th posterior cells, one on outer side of discal cell, and the last one suffusing the anterior cross-vein. Cross-vein joining upper branch of cubital vein to subcostal vein, with a recurrent appendix, only three submarginal cells. Length 4 lines. Two specimens, Ceylon."

The above is Schiner's description, he compares it with

E alexon, Walk., and punctulata, Macq

Type presumably in the Vienna Museum.

#### 156. Exoprosopa niveiventris, Brun.

Eromosopa nivewentris, Brun Rec Ind. Mus. in, p 214 (1909)

Head: from at widest (level of antenna) one-third the width of the head, narrowing at vertex to half this width; dark brown, covered with close, light brownish-orange scales, which become lighter coloured below the antenna, the whole from covered with short black hairs; ocelli small, black, close together. placed on a small tubercle; mouth-border yellow, proboscis dark brown. Antennæ black, 1st and 2nd joints thickly beset above and at the sides with strong black bristles; 3rd joint rather long, absolutely bare, with a very distinct style, which itself bears a microscopic but distinct apical joint. From the base of the antenna obliquely to the edge of the eye there is on each side of the from a narrow groove, quite destitute of scales or pubescence. Back of head broad behind the eye, with minute black pubescence, and covered towards the sides with solt yellowish-white scales, which may perhaps extend over nearly all the back of the head in some specimens, a fringe of short, bright orange-vellow hairs encircles the back part of the head, inceting the dense pubescence of the thorax. Thorax dull black, with some short black hairs towards anterior border, and in front of the scutellum; front part of thorax (not extending to the dorsum proper) covered densely with narrow, elongate, bright yellow scales, which also extend to the sides of the thorax, and form fanshaped bunches below each shoulder and behind each wing; these scales become almost thick pubescence at the sides of the dorsum, being especially thick above each wing. The true dorsum

is very sparsely covered with very short yellowish scales, which probably even in perfect specimens never wholly cover the surface; scales at sides of thorax more vellow than orange. Posterior calli prominent, ferruginous, covered with irregular small black bristles, with some long yellowish-white scaly pubescence on the outer side, and there are four powerful long black spines placed close together and directed horizontally backwards Soutellum terruginous brown, with an irregular double row of black spines on posterior margin, and short yellow scales round the dorsum, which is quite bare in the middle, both of scales and hairs Abdomen black, covered with microscopic black scales, thick, scaly, whitish pubescence at the sides of the 1st segment, at the base of the 2nd segment (which is the widest) a wide band of scaly yellowishwhite pubescence; the remaining segments also bear similar bands at their bases of more whitish scaly pubescence, this being shortest on the 5th segment, on the posterior borders of the 1st. 6th, and 7th segments a row of rather strong black bristles, directed backwards Genital organ distinct, black, encircled towards the posterior part and at the sides by a rather thick fringe of orange hairs; the tip itself more greyish, and bearing two vertical rows (containing seven in each) of rather long, roseate scales, like the teeth of a comb Venter black, nearly covered, except towards the tip, with close, nearly snow-white, scaly pubescence, the tip with black bristles Legs black; coxe with yellowish-white scales and distinct black bristles; femora with similar scales and short black bairs, the middle pair with two rows of short, distinct spines on underside; the hind pair with a similar row; fore tibiæ bare, middle tibiæ beset somewhat irregularly with four rows (one on each side) of conspicuous but moderately short bristles, hind tibiæ closely beset with elongate dirty white scales, lying close to the surface, and intermixed with strong, moderately short, black bristles, and with an irregular circlet of black spines at tip, most of them on the underside, taisi minutely but closely pubescent, with a row of minute spines below, being longest on hind pair Wings pale grey, costal cell and the basal parts of all the veins ferruginous brown; costal vein apparently bare, but viewed inicroscopically, it presents a very closely-placed row of minute black spines, which are conspicuous on the extreme base of the costa, where they are larger and are intermixed with close-lying, dark greyish scales; at the extreme base of the costa is a very powerful, thick, black, curved spine Tegulæ bright orange, with a fringe of elongated scales, which are black on outer part of the edge and dirty white towards the base, alula of wing grey, with a fringe on posterior border of grey scales, which continue for a short distance along the posterior margin of the wing, halteres with stem brownish, club very pale creamy orange.

Length, 18-20 mm.

Described from two QQ in the Indian Museum, taken by Dr. Annandale at the base of Paresnath Hill, West Bengal,

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16. iv. 1909 (1000 ft.), South Coorg, S. India, 15-26 v 1914 (*Fletcher*); Trincomali, 15. ix. 1890, and Mahagany, Ceylon, 8 n. 1891 (*Col. Yerbury*)

A conspicuous species, resembling a Hyperaloma of my fourth

group (Rec. Ind. Mus 11, p 443)

A single of was taken by Dr Annandale in company with nivewentris Q, of which species I conclude it to be the of. The from is barely appreciably narrower, therefore the narrowness of the back of the head above, the difference in shape of the genital organs, and the nearly clear wings are the only points in which it

materially differs from the previously described species

Head almost exactly as in niverventris, except that the first joint of the antenno is pale, and the back part of the head is less puffed out behind the eyes, where it is covered closely with very small creamy-orange scales; mouth-border whitish, bare. Thorax dusky olive-brown, with two faint but distinct, narrow, widely separated, blackish lines; anterior part and sides with pubescence as in mivewentris, except that it is whitish below the posterior calli, scutellum as in niverventris. Abdomen as in niverventris. The genital organ is concealed within the body, but is covered with whitish shimmer and fine black bristles, its tip apparently consisting of a pair of rather complex orange-coloured claspers, the upper side of the tip being covered with thick, black, bristly spines. Legs with the underside of the fore femora pale and the spines below the hind tarsi less conspicuous Wings wholly very pale grey, including costal cell, the veins in the middle at the base of the wings are pale orange, as are also the subcostal, third and fifth longitudinals, halteres cream-coloured

Length, 16 mm.

### 157. Exoprosopa vitripennis, Brun

Exoprosopa vitripennis, Biunetti, Rec. Ind. Mus. vii, p 469 (1912)

J. Head: from above antenne nearly one-third the width of the head, lessening to one-third of that width at the vertex, shining black, with short black pubescence and pale whitish-yellow scales above the antennæ and over the shining black face also, these scales show prismatic colours in cortain lights, antoniae dark brownish yellow, 3rd joint ending in a fine point, oral opening whitish yellow, bare, or with a few very short pale yellow hairs, proboscis rather long, blackish, palpi black, curved, very slender, with short hairs; occiput and underside of head black, a few scales closely pressed to the surface, behind the eyes. Thorax shining black, with milk-white bristly hairs on the sides, anterior border of dorsum, and around the wings. Scutellum dull coffeebrown, some small white scales below its hind margin, closely applied. Abdomen black, moderately shining, almost bare; small milk-white scales at the bases of the segments towards the sides: venter black, with the basal part of most of the segments covered with small snow-white scales. Legs wholly black, except for a

slight dull brown reflection on the tibiæ in certain lights Wings absolutely clear, vitreous, highly iridescent, costal, auxiliary, and 1st longitudinal veins and those at base of wings yellowish, the remainder black; halteres yellow.

Length, 10 mm

Described from a single 3 in the Indian Museum from Mahabaleshwar, Satara District, Bombay Presidency, 4200 ft, 13-16 iv. 1912 (Gravely), in the British Museum, from Trincomali, 4 iv. 1892, and Mahagany, Ceylon, 12. ii. 1891 (Col Terbury).

Very near E vitrea, Big, differing by the wholly reddish-brown antenne, the whitish hair on anterior margin of thorax, the wholly black scutellim, the wholly clear wings, and the absence of any reddish colour towards the sides of the dorsum.

#### 158. Exoprosopa vitrea, Big

Etoposopa vitrea, Bigot, Ann. Soc Ent. France, lxi, p. 344 (1802), Brunetti, Rec. Ind. Mus. vii, p. 468, pl. xxxvii, fig. 5 (1912).

3 9 Head from at level of antennæ barely one-third the width of the head, narrowing to nearly one-third of that width at vertex in & and to half that width in Q, black, with black hairs, the lower half with short bright yellow scales, face with similar scales and a few short bright yellow hairs, facial bump fairly large, mouth-border pale whitish yellow, proboscis black; antennæ black, no trace of lighter colours, back of head moderately protruding, black, with an irregular narrow fringe immediately behind the eyes of very small greyish-white scales lying close to the surface; hind maigin of head with a fringe of short yellow or yellowish-Thorax dark blackish brown, anterior margin and shoulders with thick bright yellow scale-like hairs, which are continued around the whole of the prothorax, but in the o they are quite black for a considerable space on the lower part (immediately below the mouth), whereas in the 2 they are sometimes uniformly yellow and sometimes similar to those of the d; surface of dorsum covered with short depressed brownish-yellow hairs; pleure with yellowish-grey or grey hairs, and some around the base of the wing. Abdomen black, with very short depressed bright yellow hairs and black pubescence in the d: the sides of the 2nd, 3rd, and 4th segments are broadly and completely covered with small snow-white depressed scales, which also form an entire band across the basal half of the two latter segments; these scales are practically absent in the 2, but a few are usually Venter blackish, the middle part a little paler, generally present with a considerable space covered with soft short white hairs: tip inclined to be reddish. A considerable amount of white hairs in both sexes at anterior corners of abdomen. Legs wholly black, with the usual fine pubescence and very short black bristles. Wings clear, costal and subcostal cells very pale yellowish grey; halteres pale vellow.

Length, 7-13 mm

Redescribed from a of and Q in cop. from Helwak, Koyna

Valley, Satara District, Bombay Presidency, 2000 ft, 28-30. iv. 1912, and several others of both sexes from other localities in the same neighbourhood, up to 3500 ft., and from the 23rd to the 30th; Khemsa, Western Ghats, 2650 ft., 5 v. 1913

The amount of yellow hair on the abdomen and the extent of

the white scales are both variable

### 159 Exoprosopa basifascia, Walk.

\_1nth; ax basifascia, Walker, List Dipt. Brit. Mus. 11, p 248 (1849).

"Head tawny and clothed with tawny hairs; mouth black; eves piceous; feelers black, ferruginous at the base, chest piceous, clothed with tawny hairs, which form a fringe along the fore border and on each side, scutcheon and breast ferruginous, the latter clothed with tawny hairs, abdomen dark piceous, with a fringe of pale yellow hairs on the fore border of each segment and more completely clothed on the underside, legs black, thighs niceous, wings slightly grey, tawny at the base and on the fore borders and along the margins of the veins; wing-ribs and veins ferrugmous, the latter piecous towards the tips, poisers tawny.

" Length of body 8 lines, of the wings 18 lines. North Bengal"

Type in the British Museum, unique

The following four species are probably from India, although secorded by Walker merely from the "East Indies" -

# 160. Exoprosopa alexon, Walh.

Anthrav aleron, Walker, List Dipt. Birt. Mus 11, p 246 (1849).

"Body ferruginous; head and chest piceous; head thickly covered with ferruginous down, eyes very dark red; feelers tawny; chest clothed with tawny hairs; breast with longer pale vellow hars, scutcheon ferrugmous, back of the abdomen clothed with tawny and white hairs, and along the hind borders of the segment with piceous hairs and thereby banded, underside rather paler and clothed with white hairs; legs ferruginous, thighs and shanks clothed with very short pale yellow hairs and beset with black bristles, feet piceous, clothed beneath with short black bristles, wings brown, which colour passes into brownish grey towards the hind border near the base, and the disks of some of the areolets in the middle of the wing are also grey, the brown has likewise a very oblique branch, which becomes grey and irregular as it approaches the hind border, which, like the tips of the wings, is grey, with the following exceptions a brown spot on the 1st and sometimes another on the second of the longitudinal veins where their upward curve approaches the fore border; two brown spots on the cross-veins near the tip, one of them mostly on the brown part, from which it is distinguished by its darker colour; wing-ribs and veins ferruginous; poisers tawny.

"Length 5 lines, expanse of the wings 13 lines. East Indies.

"From Archdeacon Clerk's collection."

#### 161. Exoprosopa semilucida, Walk

Anthrax semilucida, Walker, Ins. Saund, Dipt. pt. 11, p. 170 (1852)

Q. "Black; head grey above, hoary beneath, clothed in front and beneath with tawny hairs; feelers black, dark ferruginous at the base, 1st joint short, hardly twice the length of the 2nd, 3rd slightly tapering from the base to the tip, about thrice the length of the 1st, 4th slender, linear, not more than one-fourth of the length of the 3rd, chest and breast clothed with tawny hairs, scutcheon dark ferruginous; abdoinen slightly obconical, a little broader but not longer than the chost, each segment adorned with a band of pile yellow hairs; the hairs beneath are hoary and occupy a large part of each segment, wings pale grey, tawny at the base and along the fore border for full three-fourths of the length, wing-ribs tawny; veins black, tawny towards the base and along part of the fore border, poisers tawny, with paler knobs. Length of the body 8 lines, of the wings 18 lines. East Indes."

#### 162 Exoprosopa auriplena, Wall.

Anthrav aur iplena, Walker, Ins Saund, Dipt. pt 111, p 171 (1852).

Q. "Black, clothed with tawny hairs; head adorned with a tawny covering, clothed with short black and tawny hairs, peristoma yellow, mouth and epistoma prominent, breast hoary, clothed with pale hairs; scutcheon ferruginous; abdomen nearly elliptical, a little longer than the chest, fore borders of the segments adorned with bands of yellow hairs; hind borders slightly ferruginous above, distinctly so beneath, which is clothed with hoary hairs, legs clothed with short black hairs, aimed with black spines; shanks dark tawny towards the base, wings grey, bright tawny at the base beneath the fore border and along the boiders of most of the veins, adorned with eight grey spots, which are mostly on the cross-veins; there are also two paler and indistinct grey spots towards the base; poisers tawny, with yellow knobs.

Length of the body 4½ lines, of the wings 10 lines. East Indies."

# 163. Exoprosopa albida, Wall.

Anthrav albida, Walker, Ins. Saund , Dipt. pt. 111, p. 171 (1852)

Q. "Black, thickly clothed with pale yellow hairs, head clothed above with yellow hairs; peristoma whitish yellow, epistoma prominent; 1st joint of the feelers pale tawny, breast and underside of abdomen clothed with white hairs; scutcheon ferruginous; abdomen mostly ferruginous, slightly obconical, not longer than the chest, clothed with whitish-yellow hairs; legs tawny, armed with black spines, clothed with pale yellow hairs, feet

and hind shanks black, wings whitish, yellow at the base and along the fore border; disks of the arcolets very pale grey, an irregular very oblique grey band extending from three-fourths of the tore border to one-sixth of the hind border, on approaching which it becomes very indistinct; wing-ribs tawny, veins black, tawny towards the base and along the fore border, poisers pale yellow. Length of the body 9 lines, of the wings 16 lines. East Indies."

#### Genus SPOGOSTYLUM, Macq.

Spongostylum, Macquart, Dipt Evot, 11, 1, p. 63 (1840). Spongostylum, Kertész, Cat Dipt v, p 58 (1909)

GENOTYPE, Spogostylum mystuceum, Macq.

2. Generic characters of Anthrax Face not prominent, with rather short hairs; from tomentose; 3rd antennal joint short, tip rounded, style of two distinct segments, cylindrical, 1st joint as long as 3rd, 2nd rather shorter, with a few hairs at tip Wings three times as long as abdomen; three submarginal cells, 1st and 2nd cells with an appendix.

Range North Africa, Asia Minor, India, Chile.

Macquart specially notes the "moustache" covering the face, the antennal style, the shortness of the abdomen, and the length of the wings. The genus is allied to Exopresopa by the three submarginal cells and to Argyramcha by the antennal style, the shortened abdomen, and the long wing.

### 164. Spogostylum austeni, sp. nov.

- ? A. Head in profile, from and face only slightly projecting, former at level of antenne rather less than one-third the width of the head, diminishing to two-thirds of that width at vertex; black (or blackish grey?), covered with depressed small brownish-yellow scales and rather dense stiff black hair; face blackish, with dense, very elongate yellowish-grey scales and long bristly pubescence intermixed; mouth-opening large, proboscis short, labella large; antennæ black, 3rd joint short, onion-shaped, style black, occiput yellowish, upper and side eye-margins with a broad fringe of minute yellowish-grey scales. Thoraw blackish, dorsum (apparently) covered with minute depressed brownish-yellow hair-like scales; anterior margin with a rather thin collar of very narrow and elongate milk-white scales, humer with black bristles, and behind these a number of strong black well-curved bristles and spines nearly reaching to the wing-roots; further strong bristles occur along margin of thorax from wing-roots to hind corners; \* a number of bristles curving hindwards along posterior margin of dorsum; pleurm with grey pubescence intermixed with black bristles. Scutellum with brownish-yellow minute depressed
- \* There are probably in perfect specimens some very strong spines on the posterior calli, and the scars of these are visible in the present example.

scales and black hairs, traces of a marginal fringe of not very strong bristles; a bunch of yellowish-grey elongate scales below each posterior callus Abdomen black, 1st segment short, covered at each side with a bunch of elongate, dirty milk-white scales; 2nd and following segments covered (except, perhaps, more or less narrowly at base) with whitish hair-like scaly pubescence, and with a transverse row of black bristles along, or just behind, the middle of each segment, some parts of the surface seem to be covered with minute black scales, a bunch of elongate dark brown scales on hinder half of sides of 2nd segment, a similar bunch of blackish-brown scales on sides of 4th segment, and others around the tip of the abdomen; sides of abdomen (except when occupied by brown scales) covered with elongate whitish scales. blackish, hind margin of segments narrowly pale brown; basal half of surface with ragged whitish scaly pubescence and black bristles, hinder half apparently with less pubescence, but tip with long black bristles Genitalia concealed, but covered with dense long bright orange scales. Legs black, femora with more or less greyish minute depressed scales on hinder sides and a row of black bristles below; tibiæ with usual bristles and covered closely with dark brown scales Wings pale grey, costal and subcostal cells brownish yellow, the colour spreading more faintly hindwards and basally; veins dark brown, those in centre of wing distinctly and narrowly infuscated, the remainder just perceptibly suffused also, except tips of 2nd and 3rd veins, halteres black, with milkwhite clubs.

Length, 15 mm, expanse, 42 mm.

Described from a single specimen (probably a 2) in the British Museum, from Labore, 1910 (G. H. Gaiger).

# Genus ARGYRAMŒBA, Sch

Argyromæba, Schiner, Wien Ent Monats. 1v, p. 51 (1860), E. & L. Coucke, Ann. Soc Ent. Belg xxxvii, p. 286 (1894).

Agyramæba, Kertész, Cat Dipt v, p. 59 (1909), Brunetti, Rec. Ind Mus. ii, p. 448 (1909)

Spoyostylum, Williston (nec Macq.), Man N. Amer. Dipt., 2nd Ed. p. 65 (1896)

Coquillettia, Williston, Man N. Amer. Dipt., 2nd Ed. p. 65 (1896).

Genotype,  ${\it Anthrax\ tripunctata}, Wied , by Coquillett's designation (1910).$ 

This genus differs from Anthrax in the following characters:
(1) the presence of a style to the 3rd antennal joint, distinctly bisected by a suture and with a pencil of hairs at its tip, this being the most constant generic character, (2) the face is shorter, not at all protruding, but rather withdrawn; (3) the male genitalia are practically symmetrical, not asymmetrical as in Anthrax and Exoprosopa; (4) the ovipositor, the tip of the abdomen being covered with rather long silky hairs as in Bombylius

etc.; (5) the fore tibix are beset with spinules, the tarsi have distinct joints, the ungues are rather large, in the  $\delta$  the front tarsi are generally longer and more slender than in the  $\mathfrak{P}$ , (6) the knee-shaped basal angle of the 2nd longitudinal vein and the fork of the 3id vein generally each bear a short appendix directed backwards.

The basal antennal joints are very short, the 3rd short, coneshaped, or flattened onion-shaped, bearing a more or less slender but distinct style, which is bisected about its middle, the relative lengths of the proximal and apical portions being often a good

specific character

"Sometimes the stout basal portion of the 3rd joint is more elougate, more gradually attenuate, with a short pencil bearing style at the end, thus showing that the portion of the style before the suture in the ordinary Argyramæbæ is nothing but a portion of the 3rd joint, and that the style beyond the suture alone is homologous to the style of Exoprosopa" (Osten-Sacken)

Range. World-wide, except Australiana

Life-history The larva of one European species, A trifasciata, Mg., feeds on the larva of a mason-bee (Chalicodoma), to which it has to find its way through any small crack of gap in the masonry, after which it undergoes a complete change of form. The pupa is provided with special apparatus for penetrating the masonry to escape.

## Table of Species

• -	
	gentilis, Brun , p 230.
2. Wings very dark blackish brown at base, the colour diminishing distally and posteriorly, but the lightest part of the wing at least pale brown.  Wings always with some clear surface, with or without various markings.	bipunctata, F, p 217.
3. Wings with distinct base-costal oblique band, with or without isolated spots Wings without distinct base-costal oblique band	4. 10 5
4. Wings with isolated spots on the clear part Wings without such isolated spots	6.
5 Distal margin of dark wing-band limited to enclosing anterior cross-vein and bases of discal and 4th posterior cells, spot on fork of 2nd vein and that at base of 3rd posterior cell quite isolated from the band itself and of some size; spot at base of 2nd posterior cell small, indistinct	TIL . 010
or absent	distiyma, Wd, p. 218.

<sup>\*</sup> An excellent translation of Fabre's description is given by Dr Sharp (Camb Nat. Hist, Insects, pt. 11, p. 486) and by Verrall ('British Flies,'v, p. 475).

Distal margin of dark wing-band including the spot on fork of 2nd vein and filling basal half of 1st posterior cell (with two lighter patches), also filling half of discal cell and including spot on base of 3rd posterior cell, spot on base of 2nd posterior cell large and distinct	[p 220 obscurifions, Brun,
6 Legs principally yellow, * tip of abdomen	_
without white scales	7
Legs all black, † tip of abdomen with con-	8.
spicuous white scales	0.
7. Legs practically wholly yellow, bifur- cation of 2nd and 3rd veins only just	
before anterior cross-vein	limitaris, Brun., p 220
Basal half of anterior, and all hind femora,	, ,
black, bifuication of 2nd and 3rd veius	
half-way between base of discal cell and	
anterior cross-vein	intermedia, ap n.,p 221
8 Wing-band extending to middle of marginal	
cell, enclosing fork of 2nd very, all the	[n 227
discal and anal cells, and nearly all 4th posterior cell	ar gentrapicalis, Brun,
Wing-band extending (apart from costal	the general production of the second
and subcostal cell) only to antenor cross-	
vein, base of discal cell, and nearly all the	
anal cell	Ð
9 Outer margin of wing-band distinctly	
oblique, lighter or derker brown, with a	
few lighter parts, anal and axillary cells always with tips quite clear for a short	
distance	gestion, Brun , p 222
Outer margin of wing-band plactically	y = = =
transverse, nearly black, with no lighter	
parts, and and axillary cells with baiely	[p. 224.
their extreme tips clear	niveicauda, Brun ,
10. Wings clear, costa slightly darker, several	[p. 225,
isolated spots present † Wings practically or absolutely clear	duvanceln, Macq, 11. [p 228
11. Femora and tibiæ wholly vellow	clarmennis, Brun,
Femora mainly or wholly black.	12
12 Larger species, 7-8 mm, abdomen appa-	[p. 220
rently covered with snow white scales	niversquames, Brun.,
Smaller species, 5 mm., abdomen with	C., 1990

A. varia, F, was introduced to the Indian fauna by me (Rec. Ind. Mus. ii, p. 450) on a single specimen from Bhim Tal in the Indian Museum. The example is now headless, and it is therefore impossible to describe the species, no other specimens

[p. 230.

.. nigi ofemorata, Brun.,

short yellow pubescence, no snow-white

scales .

<sup>\*</sup> A appendiculata, Big, comes here, it is impossible to place it any closer from the description

<sup>†</sup> Occasional specimens of gestros have the legs pale brown † A. instituta, Walk (p. 227), comes with duvaucetis, and is possibly identical, but must be regarded for the present as requiring confirmation as Indian

being available. It seems wiser to await further material rather than give an unsatisfactory description, though I still believe the Bhim Tal specimen to be correctly identified. Should varia really occur in India, it will be distinguished from durancely, Macq., by the vellowish tibix

A degenera, Walk (Anthran) also comes here, but requires confirmation as Indian. It was introduced by me on three specimens in my collection from Kandy, which were identified as probably this species, but they have been sent to England and are

not available for comparison

#### 165 Aigyrameba bipunctata, F

Inthias bininctata, Fabricius, Syst Antl p 118 (1805), Wiedemann Auss Zweifl 1, p 286 (1828), Brunotti, Rec. Ind Mus. n, p 448 (1909)

Anthra carbonaria, Walker, Ins Saund, Dipt pt in, p 173 (1852)

3 2. Head: from blackish grey with black hairs, in 3 at vertex less than half as wide as it is just above antenua, where it is rather more than one-third the width of the head; in Q less narrow at vertex and almost exactly one-third of the head just above the antenna; face of similar colour, with black hairs and a considerable number of black bustles in the region of the mouth, the border of which is brownish yellow, proboscis dark, with dark brown labella; antennæ blackish, 3rd joint reddish brown, ocellar triangle reddish brown, vertex blackish grey, rather shining, with some brown hairs on hind margin. Thorax black, moderately shining, with very sparse pubescence, long black bristly hair on anterior margin, carried downwards, forming a complete collar; also on and below shoulders and on mesopleure, humeral and posterior calli dark brown, latter with strong black spines; some spines towards sides of thorax; pleure blackish grey, sparsely pubescent. Abdomen black, with short sparse black pubescence and a patch of small elongate snow-white scales towards each side of dorsum of 1st segment, a bunch of scale-like black bristles on the actual sides of that segment; sides of all segments with stiff black hairs; venter black, with moderately long stiff black hairs. Genitalia in & large and complex, turned slightly but distinctly to the left, shining bright brown, with sparse hairs, a little blackish here and there; consisting of an oblong slightly curved dorsal plate, a pair of claspers, the 1st joint large and conical, the 2nd very small, finger-like, horny, pointed, slightly curved; a large bulbous lower piece, an intermediate pair of pale yellow filamentous organs, and a very large semicircular ventral plate; genitalia in 2 concealed. Legs black, tibic often more or less dark mahogany-brown, coxe with numerous black bristly hairs, femora and tibie with small grey scales closely applied, and with black bristles; both scales and bristles more conspicuous on hind legs; tarsi with black pubescence and short bristles, which are stronger on hind pair. Wings dark blackish brown on anterior part for three-fourths of their length, the colour gradually diminishing in intensity hindwards to the wing-margin, which is dark grey, halteres dark brown Length, 15-16 mm

Described from four o o and two Q Q in the Indian Museum, mostly in inferior condition, from Karachi, Calcutta, and Purneah (Bengal); also seen from Kumaon, v. 1910 (Chatterjee); Pusa, Bengal, 16 vi. 1909, 3. vii 1906; Chapra, Bengal; Surat, Bombay, 14 m. 1904, Assam, v 1913, Konau Kuppam, 16-20 vi. 1913. This is a very marked species, and cannot be confused with any other in the family.

Types in the Copenhagen and Vienna Museums.

#### 166. Argyramæba distigma, Wied (Pl. III, fig. 10.)

Anthrax distigma, Wiedemann, Auss Zweifl 1, p. 309 (1828) Spogostylum distigma, Coquillett, Proc US Nat. Mus xxi, p. 318 (1898)

Argy anweba distigma, de Meijere, Tijd. v Ent 1, p. 241 (1907)
Brunetti, Rec Ind. Mus ii, p 449 (1909).

Anthox argy opyga, Doleschall, Nat. Tijd Ned. Ind xiv, p. 401 (1857) and xvn, p 93 (1858)

Anthrax tripunctata, Wulp, Tild v Ent xi, p 109, pl iv, fig. 1 (1867), Osten-Sacken, Ann Mus Gen. xvi, p. 433 (1882).

of ♀ Head: from a little more than one-third the width of the head above antennæ, about three-fifths of this width at vertex, blackish grey, with black pubescence, and over more than the lower half the usual small grey scales; face dark grey, with fine black hairs at sides and bristly hairs around mouth-border, which latter is yellowish white; probosers dark brown, with large dark brown labella; occipit blackish grey, with greyish-whito scales near eyemargins and a fringe of dark brown hair on hind border. Antenno black; 1st and 2nd joints very short, with black bristles; 3rd short, stumpy onion-shaped, the produced part very narrow at base, cylindrical; the style distinct, rather long, with a conspicuous pencil of hairs at tip. Thorax black; dorsum wholly covered with minute adpressed bairs like grey scales, a rather thick collar on anterior margin of elongate very narrow grey scales, behind which are numerous rather long bristly black hairs; a large patch of similar elongate grey scales over the humeral region and in front of the wing-base, hind margin of dorsum with a little longor grey pubescence mixed with bristly black hairs, and a row of curved black bustles near the edge; black bristles of various sizes occur along both side-margins of the dorsum, whilst the hind corners of the thorax bear fine powerful black spines directed backwards; pleuræ covered with short grey pubescence, with black bristly hairs intermixed. Scutellum black, with minute adpressed grey hair-like scales and a row of ten or more strong black bristles on hind margin, besides numerous irregularly-placed black hairs. Abdomen black; 1st segment rather dark bluish grey, with fine black pubescence, and at each anterior corner a large conspicuous bunch of very elongate narrow milk-white scales, rest of dorsum covered with minute black adpressed scales, with numerous black hairs intermixed, and a row of longer curved ones towards hind border of each segment, towards and over the sides of each segment after the 1st, a bunch of long dark brown scales with longer black hairs, a small white scale-spot occurs towards each side on hund borders of 2nd and 3rd segments, along the base of 3rd and hind margins of 3rd, 4th and 5th segments are small silvery-white scales irregularly placed, or sometimes forming a narrow complete band; tip of abdomen more or less covered with long broad white scales, extreme tip with copious long black hairs, genitalia mainly concealed, the surrounding pubescence long, light brownish yellow. Legs black, upper side of femora more or less with minute adpressed whitish scales, posterior pairs with some black bristly hairs below, which are much stronger on hind pair; tibiæ and tarsı dark brownish yellow, latter blackish towards tips, anterior tibiæ with minute whitish scales, middle pair with dark brown overlapping scales Wings nearly clear, with dark brown basocostal band, extending from towards end of costa, leaving extreme tip of subcostal cell clear, slightly irregularly to anterior crossvein, thence encroaching narrowly over the edges of hasal half of discal cell, thence to anal margin, cutting anal and axillary cells about their middles, generally leaving anal margin itself nearly clear. The outline of the brown colour is thus in general direction straight, yet actually always more or less zigzag. A small roundish brown spot over fork of 3rd vein and reaching to 2nd vem, a similar smaller spot over base of 3id posterior cell; and distal margin of discal cell narrowly infuscated, halteres dark brown, with yellowish-white knobs.

Length, 6-11 mm.

Described from a good series of both sexes in the Indian Museum, Pusa, Dehra Dun, and my own collections. It is generally distributed in India from February to May, and in September and October, so that it may be two-brooded yearly. Recorded from Pusa practically all the year round Darpling, 1000-3000 ft.; Singla, Darpling Distr., Runjit Valley, Sikkin; Nami Tal; Calcutta; Lucknow; Parasnath., Snipur., Kushtea, Medha; Punneah, Pophh, Chiplun; Hamirpur, Guindy, Madias; Octacamund, S. India, 7500 ft. (Fletcher); Mettupalaiyam, S. India, Bangalore, Khasi Hills; Moulmein, Kawkareik, Amherst Distr., Tenasserim; Kandy, Ceylon

Type in the Leyden Museum.

This species shows considerable variation, mainly in the extent of the small white scales on the abdomen and in the wing-markings, the three isolated spots being often much reduced in size, or one or more may be absent, in one specimen, taken on board ship 10 miles off the Madras coast, all three are absent. The variety tripunctata, Wulp, has these three spots reduced exceedingly, and the dark band fills the whole of the anal and axillary cells.

### 167. Argyramæba obscurifrons, Brun. (Pl. III, fig. 11.)

Argyramæba obscurifrons, Brunetti, Rec Ind Mus 111, p 216 (1909)

P Head from moderately wide at vertex, increasing to double the width at level of antennæ, where it forms one-third the width of the head, grey, with blackish patches, covered rather thickly with black hairs and with some whitish scales intermixed just above the antenne, ocellar triangle distinct, small, with some hairs, antennæ with 1st and 2nd joints black, bristly, 3rd grey-dusted, bare, apical style rather short; underside of head blackish grey, with a moderately thick band of bristly hairs across lower part of face; proboscis withdrawn, apparently dark brown; occiput dark grey, minutely pubescent, with some minute pale scales just behind the eyes, which latter are black. Thorar blackish grey, with a rather thick fringe of bristly hairs in front, reaching over the shoulders and continued below, bristly hans between the shoulders and the roots of the wings; sides lighter grey, with occasional whitish reflections, nearly baie, scutellum blackish grey, with soft black hans. Abdomen black, covered mainly with soft black hairs, a thick bunch of white hairs on each shoulder, behind which, on the posterior border of the 1st segment, near each side, are a few snow-white scales; there is also a row of white scales (more or less interrupted in the middle) on the posterior border of the 2nd segment, and another on the last segment Venter black, softly pubescent, with some whitish hans in centre, and a longitudinal stripe of short vellouish hans near the tip. Legs black, minutely pubescent; femora with a few soft black hairs below, posterior tibiæ with short bristles on outer and hinder sides Wings very pale grey, with the oblique basocostal dark brown band occupying nearly half the wing, passing across the middle of the discal cell (where it is somewhat extended) to the hind margin of the wing, which it reaches just before the tip of the anal cell, the colour is extended also from the costa to about the middle of the first posterior cell, enclosing a clear spot near the base of the first submarginal cell, and another near the base of the first posterior cell, on the outer cross-vein there is a circular spot, and a trace of a small one on the costa, near the tip of the maiginal cell, halteres yellowish.

Length, 7 mm.

Described from a single specimen in the Indian Museum from Phagu, 9000 ft, Simla District, 14-15. v. 1909 (Annandale).

### 168 Argyramæba limitaris, Brun.

Arguramæba limitanis, Brunetti, Rec. Ind Mus. in, p. 217 (limitanisis, lapsus) (1909)

Q. Head from one-fourth of head and vertex, widening to one-third at level of antennæ, with rather thick brownish-black

hairs; ocellar triangle inconspicuous, face blackish, with hairs which from above appear whitish giey, antennæ with 1st joint black (remainder missing), probosers withdrawn, with mouthborder reddish brown, back of head only slightly puffed out, blackish giey, with some whitish hairs Thorax shining black, with some yellowish-white hairs and stiffer bristles towards the posterior corners, sides of thorax black, with some whitish hairs; scutellum dark concreous grey, with vestiges of some short yellow hairs, and a few pale yellow bristles on posterior margin Abdomen blackish grey, with a slight brownish fringe, covered more or less spaisely with short pale yellow hairs, most conspicuous on borders of segments, a bunch of whitish hairs on each shoulder of the 1st segment, venter with whitish hairs Legs coxe yellowish grey, with whitish pubescence; femora and tibic pale yellow, the latter with minute bristles, tarsi blackish towards tips Wings nearly clear, a rather bright yellowishbrown base-costal band extends along the costa just beyond the middle, thence extending posteriorly along a line comprising the inner cross-vein, the base of the discal cell, and the outer side of the second basal cell, below this cell the colour immediately fades away to a pale grey, which covers the anal and axillary cells Appendix of the upper fork of the 2nd vein short but distinct. Halteres creamy yellow.

Length, 5 mm.

Described from a perfect specimen (except for the missing antennæ) in the Indian Museum from Hathikund, Garhwal District, base of Western Himalayas, 3. v. 1909

# 169. Argyramœba intermedia, sp. nov.

3 2. Closely resembling Aphæbantus ceylonicus, Brun. Antennal 3rd joint short onion-shaped, prolonged into a long style, with the tip bisected, bearing the normal pencil of hairs and a central inicroscopic bristle, 1st antennal joint flattened and

spread out, whitish, with white, not black, bristles.

It differs from ecylonicus as follows —(1) In the subfamily character of the comparatively long prefurea, which in Aphaebantus is relatively short; in intermedia the 2nd and 3rd veins diverge opposite half-way between base of discal cell and the anterior cross-vein. (2) From in 3 of appreciable width at vertex (in ceylonicus the eyes are almost contiguous there), frontal pubescence more whitish than yellow. (3) General pubescence of thorax, pleurs, and abdomen yellowish grey or whitish, never bright yellow. (4) Abdomen wholly blackish grey. (5) The base-costal half of wing rather bright brown; the line of demarcation running from tip of 1st vein to tip of anal cell, cutting the discal cell at about its middle; the outline mainly straight, but not sharply defined. (6) Basal half of anterior femora, and all the hind femora (except narrowly at base and, perhaps, tip)

blackish grey, though covered with white scales and pale pubescence.

Length, 6 mm.

Described from two specimens in good condition in the Indian Museum from Puri, Orissa Coast, 24-28 i 1918 (type) (Annandale and Gravely); Allahabad, iii 1916 (Howlett) Two other specimens in bad condition in the British Museum are from Trincomali, 24. ix. 1891 (Yerbury).

The four examples in the Indian Museum from Allahabad differ from the typical form by the sides of at least the 2nd and 3rd abdominal segments being more or less yellowish, and by all the legs being yellow, except the black band at the base of the fore femora and a broad apical or subapical one on the hind femora.

The specimens are also slightly larger.

Two Q in the Indian Museum differ from typical intermedia only in all the legs being orange, with at most the extreme tip of the hind femora on the upper side with a very small black streak and a few tiny black bristles. The wings are wholly clear, the costal cell pale yellowish. In one specimen a faint basal suffusion, extending only a short distance, is apparent. The 1st antennal point is as in true intermedia.

### 170. Argyramæba bigoti, nom nov.

Angyramæba appendiculata, Bigot, Ann Soc. Ent. Fr lx1, p 347 (1892)

"Antenne, face, and frons black; thorax black, with a little grey pile and some black hairs, bright in front as well as on the sides, scutellum dark brown, with a little grey pile, halteres tawny, knobs yellowish white. Abdomen (denuded) black, some black hairs at tip, also at sides, legs reddish, except the femora, which are black nearly to the tip. Wings hvaline, at base broadly dark brown, this colour extending to two-thirds of the anal cell, covering by a light extension the external transverse vein; the angles formed by the 3rd vein and the forking of the 4th (Rondans),\* with rather long appendices.

"Pondicherry, 2 specimens."

Type in the Bigot collection.

The name appendiculata has been used twice before in this genus, on both occasions by Macquart, firstly in 1849 for an Algerian species described as a Lomatia, and secondly in 1855 for a species from North China under the genus Anthrax.

# 171 Argyramœba gestroi, Brun. (Pl. III, fig. 12)

Angyramæba gestroi, Brunetti, Rec. Ind. Mus. vii, p. 470, pl xxxvii, fig. 7 (1912).

3. Head. from immediately above antennæ one-third the width of the head, diminishing to half that width at vertex,

<sup>\*</sup> Meaning Rondani's terminology.

covered not very closely with elongate bright yellow hair-like scales, these being absent towards the vertex, also with stiff black hairs from vertex down to and below antennæ. Antennæ blackish grey, 3rd joint shortly conical, with rather long style, and the usual pencil of short hairs at tip. Underside of head black, some stiff black hairs and a small quantity of deeper yellow hairlike scales on each side below, but not contiguous to, base of antennæ, mouth-opening small, black; occiput rather widely produced behind eyes, black, with a patch of small yellow scales behind the middle of each eye, and a fringe of very thick short dark brown hairs at hinder margin of occiput Thorax (somewhat denuded) black, with moderately thick bright yellow and whitishgrey bristly scale-like hairs intermixed around the shoulders, the sides and anterior margin of dorsum, the whitish-giev scaly hairs in this latter part being more prominent, dorsum with very short recumbent bright yellow hairs; the usual strong bristles towards the sides, a certain quantity of stiff black hairs on anterior and posterior parts of thorax, whilst the dorsum is lightly covered with softer sparser black pubescence Scutellum blackish, sometimes dull reddish brown, with very short recumbent bright vellow hans and soft black pubescence, and a row of about twelve long curved brownish-yellow bristles on posterior margin Abdomen blackish, with short bright yellow recumbent hairs and longer yellow bristly hairs, more or less in a row towards the hind border of each segment, at each side at the base of the abdomen a large bunch of long milk-white scale-like bristly hairs, the edges of the segments bearing rather thick yellow bristly hairs, with some similar long black hairs about the middle of the actual edges of each segment; the last three or four segments bear some large elongate milk-white scales, and isolated similar scales are attached here and there towards the sides of the posterior margins of some of the other segments Venter blackish, with rather thick yellow and white hairs on the posterior boiders of all the segments, genitalia lather large, concealed, brownish yellow, apparently consisting of a pair of plates. Legs with come and femora dark brown; fore coxe, at least, with some yellow hans and black bristles; tibice and tarsi blownish yellow, both, with the temora also, with very short bristles Wings hyaline, basal half blackish brown, the limits of the colour forming an irregular diagonal line from the fork of the 2nd longitudinal vein (which is immediately above the anterior cross-vein) towards the anal margin of the wing (though the colour dies away at the border), and just enclosing the base of the discal cell and the posterior cross-vein, costal and subcostal cells blackish brown to their tips, a semi-hyaline elongate spot in marginal cell immediately proximad of tork of 2nd longitudinal vein, another similar spot just below it, in flist basal cell, in which same cell there is a third similar spot towards its base; an irregularly-shaped semi-hyaline spot of some little size at upper outer angle of 2nd basal cell; halteres yellowish, with whitish clubs. Length, 6-8 mm.

Described from several specimens in the Indian Museum from Medha, Yenha Valley, Satara District, 2200 ft., Bombay Presidency, 17-23 iv. 1912 (Gravely—type), Pallode, Travancore, 13. xi. 1908 (Annandale), Bangalore, ii 1910, Chapra, Bongal (Machenzie)

This species is very near A (Anthraw) carbo, Rond., but Prof Gestro has very kindly compared a specimen with Rondam's type in the Genoa Museum and pronounced it quite distinct, in spite of the similarity of characters contained in the description of that species. It is with pleasure, therefore, that I name the present species after Prof Gestro

The legs are sometimes much paler, occasionally wholly pale

#### 172. Argyramæba nivercauda, sp. nov.

3 9. Head from in 3 two and a half times, in 9 less than twice as wide at level of antenne as at vertex, dark grey, covered rather thickly with stiff black hairs, and on lower part with small elongate snow-white scales intermixed, face dark grey, with black bristly hairs and some pale softer hairs around mouthopening, antennæ black, 3id joint microscopically grey-dusted; occiput considerably puffed out, with a fringe of short brown hairs around hind margin, and some minute snow-white adpressed scales around eye-maigins Thorax black, dorsum with short black pubescence; anterior margin with collar of whitish-grey scaly pubescence, with a fringe of long black scales immediately behind it, some whitish scaly pubescence from shoulder nearly to wing-base, surmounted by a fringe of black bristly pubescence; pleuræ blackish giey, with black softer pubescence. Scutellum black, with black pubescence and apparently a few minute whitish scales, hind border with black bristles. Abdomen black, with recumbent black bristly pubescence and (apparently) the surface covered, except where scales are present, with minute dead-black adpressed scales; 2nd and 3rd segments, at least towards sides, with small snow-white scales on hind margins,\* 5th segment with a small patch on hind margin near each side; 6th and 7th wholly covered with larger brilliant snow-white scales, hind borders of all segments, including the last two, with a row of fine bristly hairs; genitalia light brown, venter black, with some fine pubescence; actual sides of abdomen, except 6th and 7th segments, with very long dark brown scaly or bristly pubescence. Legs dark brown; femora and tibie with closely-impressed dull greyish scales that shine in certain lights; pulvilli white. clear, distal half highly midescent, basal half brown or blackish brown, the colour filling costal cell, and otherwise limited by a slightly irregular line from tip of 1st vein to tip of anal cell, embracing anterior cross-vein, but not encroaching on 3rd posterior cell. Anal cell just closed on border in type of and second 2,

<sup>\*</sup> In more perfect specimens these scales may form a complete transverse band

narrowly open in type Q: halteres dark brown, with dull creamyyellow knobs.

Length, 6½-7 mm
Described from three specimens in rather good condition: Pallode, Trivandrum, Travancore, 15. xi. 1908 (Annandale), type of, Calcutta, 1. vi 1909, type of; Sylhet (Maj. Hall), Chapra, Bengal.

Types in the Indian Museum.

This species evidently bears some resemblance to de Meijere's fullax, from Java, and was recorded erroneously by me as that species (Rec. Ind Mus 11, p. 449, and 111, p. 221).

#### 173. Argyramœba duvaucelii, Macq. (Pl. III. fig. 13.)

Argyramaba duvanceli, Macquart, Dipt Exot ii, 1, p 63, pl xx. fig 7 (1840). Anthran duvaucelli, Brunetti, Rec Ind Mus 11, p 452 (1909), and ni, p 219 (1909)

of Q. Head, from at level of antennæ one-third the width of the head, narrowing at vertex to one-third of this width ( &) or about half this width (2), blackish grey, with short soft black hairs; face with moderately long and thick white hairs; mouthborder very narrowly yellow; proboscis dark brown, shining, Antennæ black, with a slight greyish-white shimmer; first two joints with black bristles, third baie, prolonged into the usual style, which is pale at the tip, the pencil of hairs quite Vertex of head with a distinct but short and deep indentation, from which a central dark grey hairy protuberance arises, bearing the red ocelli, placed closely together. Thorax dark cinereous, the dorsum with sparse yellowish short hans round the edges, anterior part with a dense fringe of very narrow long greyish-white scales, intermixed behind with long soft black hairs, these latter continuing more or less over the whole dorsum, but rather shorter, sides of thorax with long thick greyish-white scaly pubescence, thickest and most scaly below the humeral region, thinner, shorter, and whiter posteriorly, and extending somewhat sparsely above the insertion of the wings. Scutellum blackish cinereous, covered with rather sparse but long soft black hairs and with traces of short yellow hairs around the whole scutellum; a now of stiff hairs on posterior maigin Several strong black spines below the edge of the dorsum anterior to insertion of wing, the posterior calli also moderately conspicuous and bearing a few stiff long bristles. Abdomen blackish grey; 2nd segment distinctly but not greatly longer than the five remaining ones, the whole dorsum apparently covered with small yellowish-white or quite white scales, which may be thickest at the bases and posterior margins of the segments; the whole surface is also covered lightly with moderately long soft black hairs, and there is a bunch of long whitish scaly pubescence at each side of the first segment, which is continued along the sides of the abdomen. Venter blackish, with short white hairs; longer white pubescence towards the base, and the last segment (in the d only) with rather closely-placed, somewhat large, and elongated snowwhite scales, which sometimes spread over the last two, or even three, segments and extend round over the sides I these white scales below the abdomen are absent, and are replaced by long black hairs on the ultimate segment. The genital organs in the & consist of a pair of stout upper claspers (9), the apical half tapering to a blunt point, each with a small lamella at the tip, this large organ is jufous brown, a little blackish above at the base, and with some reddish-yellow hairs on the inner sides, below these large claspers are some further, apparently complex organs, which are not easily visible, the whole being protected by a large black curved ventral plate, bearing on its margin reddish hair near the base and black han posteriorly. In the 2 the genital organs consist of a rather large subconical process with dense reddish or yellowish hair, in one example this organ is almost wholly withdrawn within the abdomen. Legs black; cox a with rather long silky white hairs; femora and tibiæ with small whitish scales, which extend, more sparsely, to the tarsi, all the femora with soft hairs below and some irregular weak bristles; the tibiæ generally with small, apparently irregularly-placed spines, the most regular being a row on the outer side of the hind tibiæ; all the legs innutely pubescent. Wings almost clear, first posterior cell rather widely open; fifth generally narrowly open, but in two specimens closed exactly on the margin; the lower side of the discal cell occasionally with the beginning of a very small appendix. Costal cell and extreme base of wing brownish yellow; subcostal cell dark brown, very narrow. Fork of the third longitudinal vein sharply angled, and with only a tendency to appendiculation (which actually occurs only in two or three specimens, in two of which, moreover, there is an additional veinlet in one wing only, this veinlet producing the cell usually characteristic of Hyperaloma). A dark brown suffusion, distinct but small, occurs at the base of the second vein, joined to that of the inner cross-vein, suffusion also at the angle of the fork of the third vein, over the outer cross-vein the colour carried upwards along the inner side of the discal cell; also over the lower extremity of the veinlet, connecting the two branches of the fourth longituduial. Costa minutely spinose, with the usual spiny portion at the base. Halteres light brown, tip of club creamy, tegulæ milk-white, with snow-white hair; alulæ concolorous with wing, bearing a fringe of minute black hairs

Length, 8-10 mm

Described from several of each sex taken at Bhogaon, Purneah District, N. Bengal, 19-26. in 1909 (Paiva); the Indian Museum also has a specimen from Sahelwa, Bahraich District, United Provinces, 11. iii. 1909 (Hodgart); and the British Museum one from the Kangra Valley, 4500 ft., vii 1899 (Dudgeon). Other specimens seen by me are from Pusa, iii, iv, ix, x (common), bred from cells of the wasp, Sceliphron coromandelianum, also taken at light. Lahore, 29. iii and 16. iv. 1909, Dum Dum, vi. 1913 (Chatterjee), 4. viii. 1913, 9 vii. 1913, Murree Hills, 4500 ft.,

2. vi. 1913 (Beeson), Chapra, Bengal (Machenzie); Allahabad, 24. iii, 7. iv. 1906 (Howlett).

Type in the Paris Museum.

#### 174. Argyramoba argentiapicalis, Brun (Pl. III, fig. 14.)

Argyrameba argentianicalis, Brunetti, Rec Ind Mus. vii, p. 470 pl. xxxvii, fig 6 (1912).

Q. Head: from at level of antennæ rather less than one-third width of head, black with black hairs, with which are intermixed on the lower part some dirty greyish scales; antennæ black, normal, face black, with thick black bristly pubescence and some greyish scales; proboscis dark; mouth-opening very narrowly pale; occiput wholly black. Thorax blackish or blackish grey, with very short black pubescence and with mainly black bristly hairs on anterior margin, around the wings, and about the shoulders and pleura; a few grey hairs intermixed adjacent to the head. Abdomen black, shortly black pubescent, a spot formed of silverywhite scales towards the sides on the hind borders of 1st and 2nd segments; a few intermediate scales suggest the possibility that in some specimens the whole hind border of at least the 2nd segment may be similarly scaled, the tip of the abdomen (two segments) covered with very conspicuous, elongate, shining silvery-white scales, which are sparser or nearly absent on the median line; venter black, black pubescent; genitalia comparatively prominent, dull brown, consisting of a pair of large lainelle and other parts; anterior corners of abdomen with copious greyish-white hairs, sides with black hairs. Legs. femora black, bearing a little sheen through the presence of very small, greyish, closely-impressed scales, tibus and tarsi reddish brown; the usual pubescence. Wings clear, more than the basal half dark brown; the line of demarcation, which is emarginate at each of the veins it crosses, running from the tip of the 1st longitudinal vein to the middle (on wing-margin) of the posterior cell, thus passing distad of the base of the 3rd vein and the discal cell Anal cell closed just before or actually on the wing-margin; the endings of the 4th longitudinal vein are liable to variation, as in the type there is an extra cell formed below the discal cell (in one wing only), caused by the upper prong of the lower branch of the 4th vein curving towards and joining the lower prong, thus closing the 4th posterior cell. In the dark part of the wing are small lighter vellowish spaces arregularly disposed, halteres black.

Length, 5-7 mm.

Described from three \$ 9 in the Indian Museum from Mahabaleshwar, Sataia District, 4200 ft, Bombay Presidency, 13-16. iv. 1912 (Gravely).

### 175 Argyramæba instituta, Walk.

Anthrax metituta, Walker, Ins. Saund., Dipt. pt. 3, p. 183 (1852).

Q. "Black, narrow, head clothed above with brown hairs, in front with tawny hairs; chest beset with black bristles, breast

hoary, clothed with whitish hairs: abdomen grey, obconical, a little shorter than the chest, beset with a few black bristles, clothed on each side and at the base with dull pale yellow hairs, legs black, clothed with short black hairs and bristles; shanks pitchy, thighs tinged with grey; wings grey, rather long and narrow, adorned with four brown spots which cloud the crossveins, wing-ribs pitchy, veins black, pitchy at the base and along the fore border, poisers pitchy, with tawny knobs

"Length of body  $3\frac{1}{2}$  to  $4\frac{1}{2}$  lines, of the wings 10-12 lines.

East India." (Walker)

Type in the British Museum.

#### 176. Argyramæba claripennis, Brun.

Argyr amæba clarrpennis, Brunetti, Rec Ind Mus. 11i, p. 218 (1909) Argyr amæba hottentotta, L., var clarrpennis, Brunetti, Rec. Ind. Mus. 11, p. 452 (1909)

3. Head from one-fourth width of head at vertex, broadening at level of antennæ to one-third, dark grey, with yellowish hairs, which on the face become greyish or nearly white; ocellar triangle inconspicuous Antennæ black, with the uppersides of the joints greyish; basal joints with rather thick hairs, bisection of style obvious, pencil of hairs small. Proboscis dark, withdrawn; occiput dark grey, with thick yellowish-grey bairs in the middle Thorax blackish grey, with short yellow hairs, of which a bunch of a paler colour is placed on each shoulder; a long and a shorter vellow spine in front of each wing, and five or six long yellow bristles towards each posterior corner, also some yellow bristles towards posterior margin of dorsum. Scutellum dark grey, with short yellow hair, and some yellow bristles on posterior margin. Sides of thorax ash-grey, white-dusted, with a bunch of greyishwhite hairs below each shoulder and whitish hairs below this again. Abdomen blackish, hardly shining, posterior margins of segments with rather wide, light brown builds; whole dorsal surface apparently covered with short, soft, bright yellow hairs, which become longest towards the sides on the posterior margin of the anal segments, where the brown segmental margins are Venter blackish grey, with minute elongated also widened. whitish scales, and becoming reddish yellow towards tip; there are two long pendent bristles towards the posterior margin about the middle of each ventral segment. Genitalia not conspicuous, Legs uniformly pale yellow, except the blackish but withdrawn tips of the tarsi, the coxe and femora rather thickly, the tibue slightly, covered with minute whitish woolly scales, the tibiæ bearing moderately short black bristles in addition, as do also the hind femora near the tip, there is a row of microscopic bristles on the hinder side of the hind tibie. Wings quite clear; submarginal cell brownish yellow; appendiculation not obvious; 2nd vein originating half-way between base of discal cell and anterior cross-vein, its upper branch forming a very distinct downward loop towards its end; halteres yellow. Length, 7 mm.

Described from a single perfect example in the Indian Museum from Lahore, 8. v. 1908.

#### 177. Argyrameba niveisquamis, Brun.

Argyramaba niveisquamis, Brunetti, Rec Ind. Mus 11, p. 472 (1909).

Q. Head from widening gradually from one-fifth the width of the head on the moderately wide vertex (where the ocelli are very close together on a very reduced tubercle) to fully one-third the width at the level of the antennæ, from and face densely covered with long drooping snow-white scales, with a few longer thin black hairs intermixed, also (more numerously) white bristles, which are longer than the scales, oral orifice oblong, white; proboscis (in one specimen, the other is headless) wholly withdrawn, antennæ black, second joint very short, third blackish grey, onionshaped, tip drawn out into a blunt definite style, (there is no trace of the usual pencil of hairs, but the antenno, of which only one remains, may be incomplete), back of head and underside dark grey, thickly covered with snow-white scales. black, almost wholly covered with snow-white bristly haus, which are longest in front (below), in front of the wings and below them; the hairs become scaly in places, and on the posterior border of the scutellum is a moderately thick band of white scales. Abdomen black, the segments covered thickly with short creamywhite and snow-white scales; a fan-shaped bunch of snow-white, comparatively softer, long hairs on the anterior corners; a few long scattered black bristles on the dorsum, and, rather more numerously, along the sides of the abdomen. Venter with scaly and bristly hairs mixed; tap of abdomen with a few rather long brownsh-yellow bristly hairs, with some longer fine black hairs below. Legs femora dark brown, with closely-set small snow-white scales; posterior femora with isolated strong black bristles; tibiæ pale brown, with silvery snow-white scales and more numerous short black spiny bristles, tarsi brown, with scattered small white scales, tips of each joint blackish, claws black Wings clear, at the base of the costa a bunch of snow-white scales with some black bustles intermixed, a very small brown suffusion at the base of the third vein and on the discal cross-vein; mediastinal and marginal veins brown, also the marrow intervening space. A strong appendix at the base of the second voin and at the base of the fork of the third vein, discal cell rather long, second posterior cell two-and-a-half times as wide on wing-border as at base. Halteres pale brown, club much lighter, tegulæ whitish, nearly transparent, with a fringe of very short white hairs.

Length, 7-8 mm.

Described from two specimens in the Indian Museum from Baluchistan (one headless).

I thought this might be nivea of Ross or perhaps Griffini's var. lioyi, but no mention is made by them of the scales with which it

is covered; moreover, the other differences are sufficient to warrant regarding my species as distinct.

#### 178. Argyramæba nigrofemorata, Brun.

Argyramæba mgnofemonæta, Brunetti, Rec. Ind. Mus. 111, p. 219-(1909).

d. Head. from very narrow, about one-twelfth of the width at vertex, enlarging to nearly one-third at level of antenne, dark grey in coloui, becoming gradually ash-grey on the face below the antennæ, with moderately thick black hair, face with thick soft white hair, antennæ black, normal, bisection of style distinct, pencil of hairs very short; proboscis brown, back of head ashgrey, with minute pubescence and some rather short thick yellowish hairs towards lower part. Thorax blackish grey, with short yellow hairs intermixed with stiff short black bristly hairs, anterior margin with rather long bristly yellow hairs; a longer and a shorter yellow spiny bristle in front of each wing-base; sides of thorax light grey, with pale yellowish or whitish hairs; scutellum concolorous with thoracic dorsum, and with some longer bristles towards posterior margin. Abdomen subconical, blackish grey, with soft short yellow hairs, venter mainly yellow, with longer yellow hairs; genitalia apparently large and complicated, but withdrawn. Legs: cox blackish, with reddish-yellow tips and whitish hairs; femora black, with bases and tips reddish yellow, whitishgrey scales, and a little soft whitish hair below, tibic reddish yellow, with small black bristles, and with thicker shorter black bristles on hinder side, all the bristles on the hinder pair being stronger than on the other pairs, tarsi brown, closely pubescent, black towards tips, pulvilli yellow. Wings quite clear; subcostal cell yellowish brown; 2nd vein originating in a knee just beyond half-way between base of discalcelland anterior cross-vein, appendiculation distinct; upper branch of 2nd vein forming a very distinct downward loop towards its end, halteres rather deep yellow.

Length, 5 mm.

Described from a perfect of in the Indian Museum taken at Hathikund, Garhwal District, base of Western Himalayas, 3 v. 1909.

A second specimen in the Indian Museum is probably this species, but the black on the anterior femora only extends to a little beyond the middle, and the sides of the abdomen are distinctly orange; from Helvak, Koyna Valley, Satara Distr., Bombay, 4 v. 1913.

# 179. Argyramœba gentilis, Brun. (Pl. III, fig. 15.)

Argyramæba gentilis, Brunetti, Rec. Ind. Mus. ii, p 470 (1909).

3 Q. Head: frons and face dull black, with black hairs; antennæ black, third joint much flattened, forming an irregularly oval disk; style distinct, black, no apparent bisection, with small pencil of short hairs at tip; proboscis short, thick; back of head blackish grey, bare. Thorax black, with a collar of stiff black

hairs on anterior margin, and soft black hairs on dorsum and sides, intermixed with some black bristles on the shoulders and posterior calli; posterior margin with some long black bristles deflected backwards, scutellum black, with short black pubescence, and some longer, curved bustles on posterior border. Abdomen dull black, with short, rather sparse, black pubescence, and a bunch of long black hairs on each shoulder, some black hairs at the sides and some longer thicker black hairs at tip; venter black. Legs black, minutely pubescent; tibes a little lighter, with short black bristles (including fore pair). Wings clear, elongated, anal cell closed, a blackish-brown band from the base, extending along the costa to just above the tork of the third longitudinal vein, the rather irregular external border of this band extends to the posterior wing-border, just in front of the anal cell, which the dark band wholly fills, the band does not quite reach the fork of the third vein nor the outer cross-vein; near the wing-tip an oblong (almost subtriangular) blackish-brown spot on the costa, barely united to the broad band, and extending downwards and outwards to just below the proximal end of the fork of the third vein, thus leaving the absolute wing-tip narrowly clear The second longitudinal vein forms a distinct angle at the commencement of the downward loop, somewhat as in Lepidanthrax.

Length, 41 mm.

Described from a of (type) in the Pusa collection, taken, 24. ii 1906, at Larksom, Bengal, and from a Q in the Indian

Museum collection from Margherita, Assam

I retain this species under Argyramæba, mainly because the pencil of hairs at the tips of the antennal style is regarded by Osten-Sacken as the most important generic character, and, though small, these hairs are present in this species. The bisection of the style is, however, not apparent, nor does the fork of the third vein show the usual appendix. The very flattened, irregularly oval, third antennal joint, the long, rather narrow abdomen, and the long wings approximate it to Arygramaba rather than to Anthrax. In one or two respects it resembles Astrophanes, O-S., a genus containing but one species (from Mexico), these are the "almost rudimentary development of the base of the costa and the closed anal cell." These two characters, in conjunction with the contiguity of the eyes on the vertex in the d, are regarded as the main generic distinction of the genus. As, however, I believe both sexes to be before me, my species cannot be an Astrophanes. The angled loop of the second vein approximates it to Lepidanthrax, O.-S., so that for the present it should be regarded as a some-, what aberrant species. It seems to bear some resemblance to Bigot's Argyramæbu appendiculata, and it is just possible it may be identical with it, but the 2 in the Indian Museum collection is labelled as a distinct species by Bigot (erroneously as a d), and I therefore treat it as such. When the two sexes are placed side by side the difference of width in the frons is sufficiently noticeable.

#### Genus LEPIDANTHRAX, O.-S'

Lepidanthi az, Osten-Sacken, Biol. Cent-Amer, Dipt 1, p. 107 (1886).

GENOTYPE, Anthrax disjuncta, Wied; by designation of Coquillett (1910)

"Antennæ widely separated at base, inserted quite near the orbits, 3rd joint short, onion-shaped, with a long filiform style, undivided by a suture, and with a microscopic bristle at the tip. Front comparatively broad in both sexes; proboscis considerably prolonged beyond oral margin, slender. Front tibue with a series of distinct spinules on upperside, front tarsi varying in structure, stout or slender, always with distinct joints; the minute hairs and bristles of the underside distinctly differentiated from those of the upper, no pulvilli, ungues without teeth. The contact of the 4th posterior cell with the discal cell immissibly long, about as long as the 3rd vein issuing from the discal cell; the distal end of the discal cell is not expanded, its sides being more or less parallel; anal cell open. The sides of the abdomen are fringed, not with hairs only but with real scales.

"Lepidanthrax will be easily recognised from the genus Anthrax, not only by the general appearance and colouring, but by its long proboscis, the more distinct spinules on the front tibus, and

the venation." (Osten-Sacken)

The exact generic characters as set up by Osten-Sacken are quoted, but those of the antennal 3rd joint and the base of the 4th posterior cell appear variable. The first species referred here to Lepidanthrax possesses a considerably elongate 3rd automial joint, with a moderate-sized style ending in a nearly transparent microscopic stumpy thick bristle In all other characters compacta fulfils the generic requirements. In the second species the 3rd joint and its style are nearly normal. I have not examined the pubescence of the front tars, as being of little value, but the comparatively elongate proboscis and the slight though distinct difference of venation will distinguish the species. The proboscis reaches forwards (in the & specimen) as far as the tip of the face, or downwards (in the 2 specimen) to a distance equal to the height of the head. The face is considerably produced, and the contact of the 4th posterior cell with the discal is very nearly equal to that of the 3rd, whereas in all Indian species of Anthrax it is never more than half that length, often 1 or 1 only. In L. transversa this generic difference is less pronounced. The species of Lepidanthrax known previously come from Central America.

The two Indian species may be differentiated thus :-

#### 180. Lepidanthrax compacta, sp. nov.

3 9. Head of 3 with from half as wide at vertex as at level of antennæ, where it forms rather more than one-fourth of the head, (apparently) dark brownish grey, covered with yellowishgrey scales, with which some fine black hairs are intermixed; face similarly clothed, mouth-opening very large, with some golden-grey hans round anterior margin; proboscis dark brown, with long yellow bristles at tip, antenne black, first two joints very bristly; occiput blackish, with small yellowish-grey scales. In Q, from rather broader at vertex, and forming nearly one-third of head at level of antenne. Thorax blackish, with very short, vellowish-grey, flat-lying scales on dorsum, and with brownishyellow or yellowish elongate scaly pubescence on anterior margin and towards sides, the usual fan-shaped bunches of similar structure below shoulders and below hind corners of dorsum; some light yellowish pubescence on pleuræ, scutellum with yellowish-grey scales and some black bristles on hind margin. Abdomen blackish, covered with short yellowish-grey depressed scales, those at base of 3rd and towards sides at bases of 5th and 6th segments are whitish; on 7th segment they are longer and almost silvery; some sparse soft brown hairs on abdominal dorsum and stiffer ones on hind margins of segments, venter blackish, covered with short yellow scales and hairs. Legs black, tabine brown; hind legs with rather broad, very thin, short, yellowish-white (3) or yellow (2) overlapping scales covering entire surface, except underside of tarsi, giving in the 2 a distinct yellow colour to the legs. Wings clear, costal and subcostal cells and extreme base of wing yellowish brown; halteres pale yellow.

Length, 5-7 mm.

Described from a few specimens in the Indian Museum and Pusa collections from Allahabad, 26 iii. 1906 (type 3), 10. iv. 1906 (type  $\mathfrak{D}$ ), 14. x. 1905 (Howlett).

Type of and 2 sent to British Museum.

## 181 Lepidanthrax transversa, sp. nov.

? Q. General characters as in L compacta. Head. frons gradually widening from vertex to level of antenuæ, where it is rather narrower than in compacta; covered with small yellowish depressed scales and erect black pubescence; face covered with dense elongate pale yellowish scales, no black bristles; 3rd antennal joint short onion-shaped, black, with long black style; proboscis lying along mouth-opening, but apparently long enough to project as far as in compacta if pointed forwards, occipit black, with small white scales around eye-margins and yellowish scales in the middle. Thorax as in compacta. Abdomen with a broad basal band of small depressed yellowish scales on each segment except the 1st; rest of dorsal surface with depressed dull black scales; posterior margins of 5th and 6th segments

with black bristles; latter also with a fringe of yellowish scales, which become white at their tips; 7th segment covered with yellowish scales and black bristles, hind border with a dense fringe of long snow-white scales; venter black, wholly covered with small pale yellowish scales. Legs black, femora and tibus covered with yellowish scales, middle tibus brownish yellow, tarsi black, joints distinct. Wings quite clear, vitreous, subcostal cell brownish yellow, base of 3rd posterior cell more sinuous than in compacta, halteres chalk-white.

Length, 9 mm.

One specimen (9 2) in the British Museum from Dehra Dun, Western Himalayas, 1907 (Lt.-Col Wyville Thomson).

#### Genus ANTHRAX, Scop.

Anthias, Scopoli, Ent Carn p. 358 (1763), Brunetti, Rec Ind.
Mus 11, pp. 451, 455 (1909)

Villa, Lioy, Atti Istit Veneto, (8) ix, p. 782 (1864).

Hempenthes, Loew, Beil. Ent Zeits xiii, p. 28, note (1869).

Dipalta, Osten-Sacken, Bull US Geol Surv III, p. 236 (1877).

Chi ysanthrax, Osten-Sacken, Biol Cent.-Amer, Dipt. 1, p. 121 (1886).

Isopenthes, Osten-Sacken, op cit. pp. 80, 96.

Pacilanthiai, Osten-Sacken, op cit. p. 119

Stonyr, Osten-Sacken, op cit pp. 80, 94

Thyridanthrax, Osten-Sacken, op cit. p. 123

Hyslanthrax, Osten-Sacken, op cit. p. 134 (1877)

Aspilopleia, Kunckel, Bull. Sci France et Belg. xxxix, p. 145, note (1905).

? Pai anthiax, Bigot, Bull Soc Ent France, (5) vi, p. lxvi (1876).

Genotype, Anthrax morio, F., by Rondani's designation.

Head semicircular, inflated behind, but slightly inarched at the middle, as broad as or a little broader than thorax, face very short, sometimes conically projecting or gently convex; proboscis short, withdrawn into the large mouth-opening, labella rather broad; palpi small, thin, cylindrical, apparently one-jointed, three ocelli; eyes in both sexes wide apart, from rather narrower in d, an indentation at middle of hind margin in both sexes. Antennæ porrect, short, wide apart at base; 1st joint short, cylindrical; 2nd cup-shaped; 3rd varying from elongate conical to flattened onton-shaped, with an apical microscopic bristle, never with an apical pencil of hairs Thorax quadrate, with rounded angles, broadest behind, with indistinct præsutural but distinct postalar bristles. Scutellum broad, short, bare of bristles. metanotum concealed. Abdomen flat, oblong, longer than thorax, 7-segmented. Genitalia small, mainly concealed, placed asymmetrically; ovipositor with a circlet of short blunt spines. Legs moderately long, hind pair lengthened and often bearing conspicuous scaly pubescence; all femora and tibiæ with short scaly pubescence in some species; fore tibiæ sometimes quite bare, sometimes with small spicules; posterior tibiæ with

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an apical circlet of spines; fore tarsi variable in shape and pubescence, front claws varying in size, pulvilli very small or absent, occasionally well developed. Wings when at rest half open. Venation as in the other Anthracine genera, only two submarginal cells, 3rd vein sometimes with a short appendix at its fork, 2nd vein not infrequently with a recurrent veinlet at its rectangular bend; both 2nd vein and upper branch of 3rd often sinuous and parallel towards their tips. A prealar hook near base of wing, generally hidden by the pubescence.

Range World-wide, a very extensive genus.

Life-listory. Larva amphipmenstic, 13-segmented, nearly cylindrical, a little flattened below, tapering at each end. Several European and North American species have been bred from Lepidopterous larva, and one from the egg-cases of a locust, others being known to live in the occoons of Hymenoptera "In cases where the Anthrax larva lives in other larva these latter pupate before they are destroyed, and the Anthrax larva lies in the pupa of its host" (Lundbeck) The imagos occur in sandy or dry districts, bare open spots and pathways, their flight is short but swift.

Several subgenera of Anthraw were suggested by Osten-Sacken, founded primarily on the wing-markings Thyridanthraw for species with brown wings with more or less hyaline spots; Anthraw (s. str.) for those with clear wings, except for a broad baso-costal dark band; Hyalanthraw for those with practically wholly clear wings or at most an infuscated costal margin, and one or two others. It was urged that these characters were supported by others, and also by the fact that the species of each group were parasitic on a totally different group, or even order, of insects. As, however, intermediate forms are sure to occur, and the subgenera have not been adopted by subsequent authors, they are herein ignored. So far as the Indian species go, fletcheri and guitatipennis belong to a group with wholly dark wings; afra, semfuscata, and himalayamus would fall in Anthraw (s. s.), whilst all the others belong to Hyalanthraw.

# Table of Species.

7.

5 Hind margin of wing-band nearly	6
straight Hind margin of wing-band with deep	himalayanus, Brun , p 238
indentations	nimulayanas, Dian, p
6 Wing-band filling less than is of the wing, hind margin clear cut.	afra, F., p 240.
Wing-hand filling fully half the wing,	
hind margin indistinct	semifuscata, sp n, p. 241.
7. Legs mainly yellow	8
Legs all black	9
8 Femora with a considerable part black,	albofulva, Walk., p 251
wings practically clear Femora all yellowish, basal half of	
wings brownish	aureohirta, Brun., p. 252.
9 Abdomen uniformly densely pubescent,	
without obvious transverse bands of	•
scales	10
Abdomen with transverse bands of	
yellowish, grey, or white scales,	I1
pubescence sparser.  10 Wing with deep brownish-black costa,	
larger species, 14-16 mm	manifesta, Walk., p 242
Wing less extensively brown, smaller	
species, $10\frac{1}{2}-11 \text{ mm.}$	clar a, Walk , p. 243.
11. Pubescence on sides of abdomen	
wholly snow-white, except for few	7
bunches of scales on each side near	aperta, Walk , p. 245.
Pubescence on sides of abdomen never	
as wholly white as in aperta	
generally yellowish grey or black	ζ
and white, and not arranged as n	ו
aperta	12.
12. Ground-colour of abdomen or tomen	
tum (apparently) reddish brown Ground-colour of abdomen black	dia, Wied, p. 250.
13 Costal cell yellowish	baluchanus, sp. n , p. 250
to continuity on the second	(hottentotta var claripennis,
	[Brun, p 247.
Costal cell lighter or darker brown*	. Z paniscus, Rossi, p. 248
	fuscolimbata, Brun, p. 246.
	(approximata, Brun., p 244.

Four species that appear to require confirmation as Indian are not included in this table, but descriptions are appended (pp 254, 255)

### 182. Anthrax fletcheri, sp nov.

- 3. Head black; frons at level of antennæ between one-third and one-fourth width of head, less than half this width at vertex; frons and face (apparently) covered with bright chrome-yellow
- \* These species are too closely allied to be satisfactorily differentiated in tabular form

small impressed scales, with the addition of black hairs on the former; antennæ all black, apical end of proboscis brown, occiput (apparently) with minute yellow impressed scales and very short concolorous pubescence; a fringe of such pubescence on hind margin of occiput. Thorax black, with small bright chrome-yellow impressed scales on dorsum and with bright concolorous long scaly pubescence on anterior and side maigins and on pleura, where it is a little paler below shoulders and wings. Scutellum black (denuded), apparently with small yellow scales as on thorax and a row of black bristles on hind margin. Abdomen black, surface apparently covered with minute black impressed scales, which are longest on the 2nd segment, an upper clothing of bright yellow small impressed scales; sides of first four segments with bunches of concolorous elongate scales; sides of 5th and most of the sides of the 6th with elongate black scales, hind part of sides of 6th with bright yellow elongate scales, 7th segment with elongate black scales on hind margin. Venter black, with minute black scales; some fine yellow hairs at base and small yellow scales on hind maigins of most of the segments Legs black, coxe with some fine yellow hairs, femora and tibia with traces of small yellow scales (mostly denuded) and the usual black bristles; middle femora with some pale fine hairs on inner Wings wholly dark brown, the anterior part still darker, anterior cross-vein distinctly before middle of discal cell, anal cell narrowly open, halteres creamy yellow.

Length, 12 mm.

Described from a unique of from Mysore, 4400 ft, 25. ii.—29. v., sent for examination by Mr T Bainbrigge Fletcher, and presented by him to the British Museum.

## 183. Anthrax guttatipennis, sp nov.

Head: from at level of antennæ one-third width of the head, diminishing to one-third as wide at vertex, black, covered (apparently), as is the face also, with bright chrome-yellow elongate scaly pubescence, intermixed (at least on frons) with long black hairs, antenno black, 1st joint bristly, 3id short onion-shaped, with long style, occiput black, with minute greyishwhite scales on eye-margins. Thorax black (denuded), with bright chrome-yellow scaly pubescence forming a collar and towards sides of dorsum, covering shoulders and extending over pleura; scutellum black, with minute bright yellow scales on posterior margin and some concolorous bristles, with which are mixed some long black ones. Abdomen black; 1st segment with a little ragged bright yellow bristly pubescence; all segments except 4th\* with broad basal bands of depressed small bright yellow scales, the bands narrowest at the centre of each segment; rest of dorsal surface apparently covered with depressed small

<sup>\*</sup> Possibly an individual aberiation.

dull black scales; a few long black bristles on hind margins of at least last two segments, sides of first four segments with long shaggy bright yellow scaly pubescence, venter black, basal half covered with small depressed bright yellow scales and somewhat longer concolorous pubescence, and apparently two or more narrow transverse rows of similar scales on apical half. black, coxe with long yellowish hairs and black bristles at tip, directed backwards; femora, at least on hinder side, with minute pale yellowish adpressed scales and a few black bristles below; tibiæ with some yellow scales on hinder side, rest of surface with closely-impressed, very dark brown scales and the usual bristles; tarsi black Wings dark blown, darker anteriorly, centre of both basal cells, discal cell, and 3rd and 4th posterior cells narrowly pale; a small elongate pale streak in marginal cell just before bifurcation of prefurca, and another towards tip of that cell, two similar streaks in 1st submarginal cell, halteres vellowish.

Length, 13 mm

Described from a unique specimen (sex uncertain) in the British Museum from Trincomali Hot Wells, Ceylon, 15. x 1891 (Yerbury).

### 184. Anthrax himalayanus, Brun.

Anthi ax himalayanus, Brunetti, Rec. Ind. Mus. ii, p. 222, figs. 1, 2 (1909) Anthi ax maura, Brunetti, op. cit. ii, p. 451 (1909).

d 2. Head black; from in d and 2 fully or over one-third width of the head at level of antennæ, between one-third and onefourth this width at vertex in d and about two-fifths in Q; froms and face with prominent long black pubescence and minute elongate yellow scales, which latter are rather longer on face, where there are also a few yellow hairs, antennæ black, 3rd joint short onion-shaped, with a long style, proboscis black, withdrawn; occiput black, with minute vellowish-white scales. Thorax black, with rather long, fine, very dark brown hairs, the surface apparently sparsely covered with minute depressed elongate vellow scales; anterior margin with a row or fringe of long brownish-yellow scales, side margins with long, pale yellow, almost scale-like Sides of thorax light grey, with elongate brownishpubescence. vellow scales and concolorous pubescence on lower part; an elongate bunch of long black scales below shoulders and a fringe of similar scales in the centre of the lower anterior margin, immediately below head, with elongate brownish-yellow scales on each Scutellum black, with minute orange-yellow depressed scales on dorsum and with fine black hairs; a row of black bristles on hind margin. Abdomen black; 1st segment with some long yellowish-grey scaly pubescence towards sides, which stretches across the anterior margin also, posterior margin with a ANTHRAY. 239

narrow row of minute orange-yellow (varying to yellowish-grey) scales; surface of 2nd and 3rd segments, posterior half of 4th, hind margins, and more or less of the dorsum of 5th, 6th, and 7th with minute reddish-yellow depressed scales; anterior half of 4th segment occupied by a transverse band of whitish scales, hind margins towards the sides of 6th and 7th segments with similarly coloured Whole surface of abdomen with fine long black pubescence, there being apparently no row of bustles on hind margins of any of the segments; sides of 1st, anterior half of 2nd, and all the 4th with white scaly pubescence; hind half of 2nd and all the 3rd, 5th, and 6th with black scaly pubescence Venter rather light grey, with minute yellow scale-like depressed hairs and long fine black pubescence, with longer more bristly black hairs towards tip; genitalia blackish, tip brown Legs dark brown; fore coxæ with a few fine yellow hairs, hind pair with black hairs, femoia with minute depressed yellowish-white scales; tibiæ with similar but apparently less numerous scales, some fine black hairs on underside of iemora, temora and tibiæ with the usual rows of bristles: (arsı blackisli Wings very pale grey, with a broad deep brown baso-costal band occupying about half the surface. the colour extending along all the costa to tip of upper branch of 3rd vein; posteriorly the colour filling axillary and anal cells except their tips, nearly half the 4th posterior cell, less than a third of the 3id posterior cell, and basal half of discal cell, a downward extension (blob) stretching across the 1st posterior cell and filling half of the 2nd posterior cell, the colour limited by the outer side of the discal cell, the colour also fills the basal half of the 1st submarginal cell and the whole of the marginal cell, except a small space in a line with the proximal limit of the clear half of the marginal cell; a small oval sub-hyaline spot in upper corner of 1st basal cell, with a narrow longitudinal (not transverse, as I erroneously noted in my first description of the species) streak above it.\*

Length, 7 -11 mm.

Described from three 3 3 and three \$\frac{Q}\$ in the Indian Museum, Kufri to Phagu, 18. v 1916, Phagu, Simla Distr., 9000 ft., 12. v. 1909, type 3; Simla, 7000 ft., 16. v. 1909, type \$\frac{Q}\$ (both Annandale), two \$\frac{Q}{Q}\$, Naim Tal, v-vi. 1893 (Lucknow Museum); two \$\frac{Q}{Q}\$, Simla, 16. v. 1909 and 9. v. 1910, on the flowers of the white stonecrop (Annandale); Khasi Hills, Assam (Brit. Mus.).

This species is very close to A, maura, L, of Europe, and was referred to under that name in my first paper on this family (l, c). I have already detailed the differences between the two species (Rec. Ind. Mus. 111, p. 222)

<sup>\*</sup> A more rough-and-leady description of the wing would be anteroproximal half dark brown, the colour cutting the 4th posterior and discal cells about their middles, a large blob from the dark part at two-thirds the wing-length reaching nearly to the hind margin, a similar smaller blob filling the curve in the 2nd longitudinal vein, and a minute 3rd blob between the 2nd one and tip of upper branch of 3rd longitudinal vein

#### 185. Anthrax afra, F

Anthrax afi a, Fabricius, Ent Syst 11, p. 258 (1794), Schiner, Faina Austr. 1, p 50 (1862), Brunetti, Rec. Ind Mus 11, p. 451 (1909)

Anthrau funbruatus, Meigen, Klass 1, p 205 (1804), id, Syst Besch. 11, p 154, pl. xvii, fig 13 (1820)

39 Head. from one-third as wide at vertex as at level of antennæ, where it forms one-third the width of the head, dark olive-brown or blackish, with black bairs and small elongate vellow scales, ocella pale, ocellar tubercle quite clear of eyemargins, face clothed as froms, eyes dark brown, antennie black, 2nd joint often dull red, 1st joint with long, 2nd with short black bristles, proboscis marked with blackish brown, occiput black, with very small yellow scales and minute white scaly pubescence in centie and around upper half of margin Thoras from dark olive-brown to blackish, more or less covered on upper surface with very small yellow flat-lying scales; towards the sides with from pale yellow to brownish-yellow bristly pubescence, which on anterior margin changes to very narrow elongate yellow bristle-like scales, a large tan-shaped bunch of which (of deeper vellow) occurs below the shoulders, extending nearly to the wingbase; on the shoulders and extending posteriorly for a short distance the scales are often yellowish white and nearly silky in nature, on the posterior calli a large fan-shaped bunch of bright yellow elongate bristle-like scales, with some whitish ones in front of them Sides of thorax with some black hairs and apparently a few yellow hairs around wing-base; scutellum with short flat-lying yellow scales and a row of long black bristles towards hind margin. Thorax with usual macrochata. Abdomen black, 1st segment with small yellow and white scales inter-mixed, anterior half of 3rd and 6th segments with small white scales; most of the 2nd segment and a band on hinder part of 3rd to 6th segments, yellow-scaled; rest of dorsal surface with black scales; the 7th segment bears white and black scales, and there is a large fan-shaped bunch of very elongate milk-white scales on anterior corners of abdomen Genitalia with a circlet of reddish-yellow spines; venter mainly with black scales and a few long pale hairs, a narrow low of small yellow scales on hind borders of segments Legs black or dark brown; femora with small, dark-brown, closely-applied scales and others that reflect a greyish lustre in certain lights; fore femora with a few stiff, moderately long hairs below, hind pair with a row of moderatesized bristles below; anterior tibiæ with short pubescence, hind pair with dark brown and greyish-lustred scales and rows of small black bristles; tarsi blackish. Wings clear, a dark brown oblique band on anterior margin extending nearly to tip of costal cell and defined posteriorly by a line drawn, with slight angulations at the veins, from that spot diagonally to the base, cutting the anal cell at one-third of its length, halteres yellow.

Length, 43-7 mm

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Described from a good number of specimens in the Indian Museum, Pusa, my own, and other collections. A widely distributed species in India. Dehra Dun, iv. and ix 1904 (Chatterjee); Anamalai Hills, 4000 ft, 24.1 1912 (Fletcher); Allahabid, 24-29 iii. 1906, 6 and 19 x. 1905 (Howlett), Satara Distr., 3200 ft., Bombay, 23. iv. 1912 (Gravely), Puri, 24-28.1 1911 (Annandale, Gravely), 29 ii 1908 and 2 iii 1908 (Paiva); Gonda Distr., United Prov., 26 ii 1907, 9 iii 1909; Madhupur, Bengal, 14. x. 1909; Pusa, common, ii, iii, vi, xi. Pipera, Gonda Distr., United Prov., 9.iii. 1909 (Hodyart); Muttra, 22 iv. 1905, Meerut, 25 iv. 1905, Ferozepore, 28. iv. 1905 (all Brunetti), Guindy, Madras (Capt Crayg), Dawna Hills, Burma, 2000-3000 ft, 2-3 iii. 1908 (Annandale), Trincomali, Ceylon, 21. viii. 1890 (Col. Yerbury); Port Blair, Andaman Is, 15 ii. to 15. iii. 1915 (Kemp).

### 186 Anthrax semifuscata, sp. nov.

d ♀. Head from at level of antennæ less than one-third width of the head, at vertex less than half this width, blackish grey, with minute bright yellow scaly pubescence, which latter also covers the face; antenna black, 3rd joint short, with long style; occiput blackish grey, a fringe of small snow-white scales on lateral eye-margins. Thorax black (denuded), hand corners of dorsum dull reddish brown; in good specimens the dorsum, anterior margin, and sides of thorax are probably covered with bright chrome-yellow scaly pubescence, which extends to the scutellum also Abdonen black; 1st segment with a band of depressed bright yellow scales; 2nd, 3rd, 4th, and 6th segments each with a basal band of similar scales, broadening towards and at the sides, where it is augmented by concolorous long scaly pubescence covering all the sides of the 2nd, 3rd, and 4th segments; 5th segment apparently devoid of such a band; dorsal surface of abdomen not covered by yellow scales, furnished with small depressed black scales; venter black, basal half with depressed bright yellow scales, concolorous scales about the tip. Legs black; femora with whitish scales on hunder side (those on fore pair appear more yellowish); tibiæ with some yellowishwhite scales; tarsi black. Wings pale grey, basal and anterior parts moderately dark brown, the colour fading away distally, its approximate limit running from tip of 1st vein, just escaping fork of 3rd vein, filling discal cell and bases of 3rd and 4th posterior cells and filling anal and auxiliary cells; halteres pale yellow.

Length, 7-8 mm.

Described from three specimens in indifferent condition in the British Museum from Trincomali, Ceylon, 2. x 1890 (type a 5), 9 and 15. x. 1890 (Col. Yerbury).

Although not one of the three specimens is in good condition, the species is a quite a well-marked one by the extent of infuscation of the wing. A noticeable point is the variability in the exact position of the bifurcation of the prefures.

## 187. Anthrax manifesta, Walk.

Anthrax manifesia, Walker, Ins. Saund, Dipt. pt 3, p 178 (1852)

3 9 Head frontal sexual differences as in A aperta, frons at level of antenne forming one-third the width of the head, black, with dense short stiff black hairs, which become denser round base of antennæ and are continued along the middle of the face, from also with very small recumbent hair-like bright vellow scales, face, except just below antenna, covered with bright chrome-vellow or orange-vellow elongated scales, intermixed with yellow hairs Antennæ black, 1st joint broader at tip, with long black bristles on outer and inner sides and yellow hairs below; 2nd and 3rd joints normal, prohoses blackish, occiput black, upper margin with very small whitish scales, centre with short yellowish pubescence. Thoraw black, dorsum with soft dark brown hairs, and some small yellow scales about middle of hind margin, opposite which are some dead-black thin scales on the scutellum. Anterior border, shoulders, and sides of thorax with long dense chrome-yellow or orange bristly, almost scale-like pubescence, which becomes paler or sometimes even whitish on underside, fan-shaped brushes of this pubescence occur as in A aperta. Abdomen black; base of first four segments with small short flat-lying bright yellow scales, thickest on 2nd and 4th segments, 5th and remaining segments with longer similar scales; the rest of the dorsal surface with small deadblack flat-lying scales and sparse long black or brown hairs. Sides of abdomen with dense scale-like bristly pubescence or very thin real scales, this vestiture varying from deep orange to yellowish in different specimens, and being, generally speaking, deeper coloured on anterior half and paler, sometimes whitish, on hinder half of abdomen, sides of 5th and 6th segments with elongate dark brown scales and longer dark brown or blackish thick bristly Venter black, covered with small bright vellow scales and sparse fine yellow hairs, both scales and hairs longer and denser towards tip, hind margin of last segment with elongate dark brown scales. Legs scaled as in A. aperta; femora with soft yellow hairs below, hind tibie with numerous dark brown or black elongate scales, intermixed with black spines and some smaller yellow scales, which latter appear to occur more or less on the middle tibiæ also and to cover most of the femora. Wings pale grey, costal and subcostal cells dark brown, the colour extending in diminishing intensity into the marginal and filling the 1st basal cell; halteres dull yellowish, variable; squamæ brownish. with a fringe of elongate orange or yellowish scales.

Length, 14-16 mm.

Redescribed from two of and three Q Q from Mussocrie. 1x. 1906; Jhajjur, Kashmir, 22.x1.1911; Simla, 26. v. 1914 (Capt. Evans), Lower Banges, Khasi Hills, 1878 (Chennell).

Type in the British Museum.

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#### 188. Anthrax clara, Walk.

Anthra: clara, Walker, Ins. Saund., Dipt. pt. 3, p. 179 (1852), Brunetti, Rec. Ind. Mus. 11, p. 452 (1909)

♂ ♀. Head from in ♂ six times, in ♀ three times as wide at level of antennæ (where it forms nearly one-third the width of the head) as at vertex, black, and, as is also the face, covered thickly with dense erect stiff black pubescence, amidst which numerous small bright yellow depressed scales are visible, more numerous on the face, where they are intermixed with yellow hairs; antennæ black, 3rd joint moderately elongate, with rather long style; mouthparts reddish brown or blackish, hind margin of eyes with a narrow fringe of small white impressed scales, which perhaps may extend over most of the occiput. Thorax black, dorsum covered with minute bright yellow impressed scales, either placed on top of (forming an upper layer) or intermixed with similar dull black scales, \* fine long black hairs are scattered irregularly over the dorsum; margins of dorsum with thick bright yellow scaly pubescence, a few black bristles at sides in front of wings and three or four brownish-yellow spines on posterior corners, directed backwards. Scutellum like thoracie dorsum; hind margin with a row of long yellow hairs and (apparently) some yellow bristles and some elongate black scales. Abdomen integument between thorax and abdomen whitish grey; dorsum of abdomen black, mainly (or entirely?) covered with very small impressed black scales, and apparently the greater part covered in good specimens with small yellow scales, margins of dorsum and sides of abdomen with dense long fine scaly pubescence, the dorsum covered more thinly, though, when viewed at a low angle from behind that part, at appears almost as thickly covered as the sides; this pubescence is rather darker yellow in the 2, on hinder part of dorsum in 2 the pubescence is black Hind margin of 6th segment narrowly, and basal three-fourths of 7th, with yellow scales; remainder of 7th with black scales; sides of 5th and 6th segments with thick bristly black pubescence; ground-colour of side margins of first three segments in o yellowish, venter black, with minute black and yellow impressed scales and some fine yellow pubescence. Legs black, femora with closely-placed small black scales, which in certain lights have a greyish tinge; small yellow scales also present; tibiæ and tarsi with small black scales and bristles Wings practically clear, costal and subcostal cells dark brown, the colour extending irregularly over præfurca and also at extreme base proximad to basal cells; anterior cross-vein just before middle (d) or at first 3rd (2) of the discal cell; halteres pale yellow. Length, 101-11 mm.

Redescribed from a of from Majkhali, Western Himalayas,

<sup>\*</sup> The dorsum of the & specimen is mainly denuded, that of the Q partly so, but probably a double covering of scales is present in perfect specimens.

6000 ft., 4.x.1907, and a \$\times\$ from Nami Tal, 6300 ft., 11. v. 1911 (Kemp), both in rather inferior condition but with all the characters fairly obvious, and both in the Indian Museum, as are also two others—one named by Bigot from Deliia Dun, the other from the Garhwal Distr., 21.x.1907 These two specimens have been compared by Mr. F W. Edwards with the types in the British Museum, where the species also figures from Deliia Dun, xi. 1907 (Lt.-Col. Wyville Thomson), and the Khasi Hills, Assam. Type in the British Museum.

### 189. Anthrax approximata, Brun.

Anthrax approximata, Brunetti, Rec Ind. Mus xiii, p. 74 (1917)

Q. This species is very close to A. clara, Walk., yet certainly distinct. The scales on the frons and face vary from yellow to snow-white, in one specimen only being yellow on both parts, in others yellow on frons and white on face, those of the latter colour encroaching to some extent on lower part of frons; in one example snow-white on practically the whole of both from and face; sometimes some yellow scales around the mouth-parts amidst the white ones. Abdomen not uniformly pubescent, as is probably the case in clara, but with distinct transverse bands of yellow or whitish scales at base of segments, those on the 2nd and 4th being widest, extending on the former segment nearly to the middle, and on the latter much further, especially towards the sides; hind borders of 6th segment with conspicuous snow-white scales and a large bunch of longer ones on about the hinder half of each side; sides of 5th segment and anterior half or more of 6th with long very dark blackish-brown scales; dorsum of abdomen, except for the transverse bands, with black scales, wholly covered with soft fine pubescence, and with a row of black bristles. on hind borders of 5th, 6th, and 7th segments, becoming stronger on each successive segment; a row of fine yellow hairs before the hind border on first four segments and a few fine yellow hairs on dorsum of basal segments. Costal cell clear or faintly obscured: subcostal cell dark brown, the colour not extending further hindwards; anterior cross-vein a little before middle of discal cell, the exact position apparently rather variable. In all else as in A. clara

Described from five & & in the Indian Museum: Simla, 7000-8000 ft, 28. v. 1914, type (Capt. Evans), and 16 v. 1909, Siliguri, base of Darpling Hills, 28 in. 1910, Dawna Hills, Tenasserim, 2000-3000 ft, 2-3. in. 1908; Kawkareik, Amherst Distr., Tenasserim, 5. in. 1908,\* and 23. in. 1910 (Annandale). In the British Museum from Khasi Hills, 1878 (Chennell); Trincomali, Ceylon, 12 x. 1890, 12. xi 1890 (Col. Yerbury), Nilaveli, Ceylon, 19. vii. 1891 (Col. Yerbury).

<sup>\*</sup> Erroneously quoted as 5. 11. 1908 in Rec. Ind. Mus 11, p 474.

The two specimens alluded to by me in my first paper on Bombyllidæ as allied to A. clara, Walk., are amongst those now referred to approximata

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# 190. Anthrax aperta, Walk.

Anthrax aperta, Walker, Ins Saund., Dipt. pt. 3, p. 180 (1852).

♂♀. Head: from m ♂ sufficiently narrow at vertex for the small ocellar tubercle to touch the eye on each side, m 2 broad enough for this tubercle to be quite clear of the eyes, in both sexes from broadening to base of antennæ, where it forms onethird of the head, black, covered wholly with black bristles and on the lower part with elongate black or dark brown scales and some shorter yellow or yellowish-white scales intermixed, face in & wholly and thickly covered with elongate bright yellow scales, with which are intermixed long black hairs, and in the median line from base of antennæ to mouth-opening a stripe of dark brown scales, in Q the face-scales mostly whitish, those in the median line yellowish, eye-facets small, uniform, antennæ black, 1st and 2nd joints bristly, 3rd onion-shaped, produced into a long bare style. Thorax black, covered with moderately short blackish-brown hairs; anterior margin with a thick fringe of reddish-tawny bristly hairs, which extend to a considerable portion of the underside. Sides of thorax with long whitish-grey scale-like pubescence, forming fan-shaped bunches about the humeral and posterior calli, near the wing-base and on the pleura; this pubescence varies from nearly white to dirty grey and yellowish. Along the hind border of the mesonotum there is always, in the narrow depression occurring just before the extreme margin, a row of very small flatlying bright yellow scales.\* Scutellum black, with some soft black hairs and (probably) with whitish pubescence.† Abdomen black; at base of 2nd segment a moderately wide band of very small flat-lying white scales; a similar but narrower band of yellow scales at base of 3rd segment and a row of yellowish or whitish (or apparently both intermixed) at base of remaining segments, rest of surface covered with small flat-lying black scales; entire dorsum covered with rather long fine dark brown hairs, which along the basal bands of pale scales appear to be replaced by whitish ones Sides of abdomen thickly clothed on first two segments with long bushy scale-like whitish hairs, on 3rd segment with long very dark brown scales and hairs, which extend a little over the sides of the 2nd segment, on 4th segment with elongate white scales, connected with the basal cross-band

<sup>\*</sup> A few of these generally remain even in hadly-denuded specimens, but there seems no reason to infer that they extend beyond the narrow space described

<sup>†</sup> This is conjecture, not one of the specimens before me bearing any pubescence

of whitish scales (which, after those on the 2nd segment, are the most conspicuous of these transverse scale-bands), on 5th and 6th segments with elongate dark brown scales and hairs; and on the 7th segment with white scales. This vestiture of the sides of the abdomen is quite distinct from the dorsal, and of much finer pubescence. Genitalia dark brown or blackish, with some fine black hairs. Venter black, with flat-lying dull black scales and sparse black hairs; hind margins of segments with a more or less broad border of whitish or yellowish scales. Legs black; coxe with long yellowish-grey hairs; femora with closely-placed very dark brown scales and a further clothing on underside of yellowishwhite scales, also with some long fine hairs; tibiæ with very short bristles, hind pair with short but distinct very dark brown scales. Wings quite clear, base of costa with thick dark brown scales. over which hes a covering of elongate silvery snow-white scales; costal cell dark brown up to humeral cross-vein; subcostal cell wholly brown, the brown colour also extending very narrowly across the wing at the extreme base, halteres dull pale yellow

Length, 8-14 mm.

Redescribed from several specimens from both Mussoorie, ix. 1906, and Simla, 16. v 1909 (Annandale); Simla, x 1911; Dehia Dun, xi. 1907 (Lt.-Col Wyville Thomson); Sukli, Dawna Hills, 2100 ft., 22-29. xi. 1911 (Gravely), Khasi Hills. Found on Sedum and the common marguerite.

Type in the British Museum.

This species is fully redescribed here from four 3 3 and five Q Q, mostly in tolerably good condition, and this must supersede my former description, drawn up from a single specimen.

# 191. Anthrax fuscolimbata, Brun.

Anth ax fuscolimbata, Brunetti, Rec. Ind. Mus xiii, p. 75 (1917).

Q. Head from one-third width of head at level of antenna, less than half this width at vertex, covered with yellowish impressed scales and black pubescence, the scales near the antennæ sometimes becoming gradually whitish; on face all snow-white in type, and yellowish white and yellowish respectively in the other two specimens; antennæ black, 1st joint with long black bristles. 2nd with a ring of shorter bristles, 3rd elongate conical, tapering to a rather long style; proboscis dull yellowish or obscure; occiput with a border of snow-white minute scaly pubescence behind eyes, and some yellow scales on upper part. Thoraw black, more or less covered with small impressed yellow scales; anterior and side margins, shoulders, and pleuræ covered with dense elongate brownish-yellow scales, which are paler on the mesopleura and sternopleura or sometimes altogether paler, a rather short fine sparse black pubescence on dorsum, sometimes remaining after nearly all the yellow scales have been worn off. Scutellum black, with small yellow impressed scales; a few fine yellow hairs and a row of black bristles on hind margin Abdomen black, with transverse bands of small yellowish, yellowish-grey, or whitish scales, broadest on 2nd and 4th segments, where, especially towards sides, they reach up to and beyond middle of segment, a narrow basal band on 3rd segment and a narrow band on hind margins of 5th and 6th, a large bunch of elongate brownish-yellow scales towards and on sides of 1st, 2nd, and 3rd segments; dorsum of 1st with sparse concolorous fine hairs. Sides of 3rd and 4th segments with elongate brownish-yellow scaly pubescence, which is paler on the latter, sides of 5th and 6th segments with numerous elongate dark brown scales and long black bristles; posterior part of side of 6th segment with a conspicuous bunch of elongate snow-white scales, 7th segment with black scales only; all the dorsal surface of abdomen, not occupied by pale scales, covered with minute impressed black scales, sparse fine pale hairs on about basal half of dorsal surface, replaced on posterior half by black ones; hand margins of segments with a row of black bristles. Venter with a broad transverse band of vellowish scales beyond middle, remaining segments with white scales, whole surface of venter plentifully covered with long yellowish or yellowish-grey hairs, with fine black hairs towards tip. Genitalia brownish yellow, with a circlet of blunt reddish-brown spines and black pubescence Legs black, coxe with rather long grey or whitish pubescence, femora and tibis with small white or yellowish-grey scales and rows of black bristles. Wings nearly clear, the brown suffusion on anterior part in type-specimen limited to subcostal cell, in 2nd and 3rd specimens extending from costa up to but not encroaching on discal cell, dying away towards tip, anterior cross-vem just before middle of discal cell, halteres creamvellow.

Described from three paratype Q in the Indian Museum, neither one being in sufficiently good condition to regard as the ultimate type; Simla, 7000-8000 ft, 26. v. 1914 (Capt Evans); Mussoorie, 6500 ft. (Bond); Guindy, Madras (Capt. Patton).

# 192. Anthrax hottentotta, L., var. claripennis, Brun.

Anthran hottentotta var. claripennis, Brunetti, Rec. Ind. Mus. 11, p. 452 (1909).

Q Head: from half as wide at vertex as at level of antennæ, where it is one-third of the head, black, covered (at least on lower part) with minute yellow impressed scales, and wholly covered with stiff black pubescence; face black, wholly covered with dense elongate yellowish-white scales; antennæ black, 3rd joint considerably elongate; proboscis obscure, withdrawn, occiput black, apparently covered with minute scales, which are yellow behind the vertex and white near the lower eye-margins. Thorax black, dorsum (apparently) covered with minute elongate yellow scale-like depressed pubescence; anterior margin, sides of dorsum, and the shoulders with dense elongate upright brownish-yellow scales;

sides with similar scales of a vellowish-white colour or concolorous Scutellum black, hind border (probably whole surface, more or less) with minute impressed vellow scales (no bristles present on hind margin, but these have probably been broken off). Abdomen black, base of 2nd, 3rd, and 4th segments with broad transverse bands of minute pale yellow impressed scales, the band on 2nd segment the broadest; 5th, 6th, and 7th segments nearly wholly covered with vellowish-white scales, which are longest on the hind margins, 7th segment with a thick fringe on hind margin of very elongate yellowish-white scales, surface of abdomen which is not occupied by yellowish scales, covered with similar minute black scales. Sides of 1st segment with elongate yellowish-grey scaly pubescence, which extends as long fine concolorous hairs across the dorsum, sides of 2nd segment with scaly pubescence as on 1st, this pubescence being continued along sides of rest of abdomen, but in gradually diminishing quantity Venter obscure, with minute snow-white impressed scales and long yellowish hairs on basal part, and with white hairs towards tips. genitalia brownish yellow Legs black, coxe with rather long yellowish or grey pubescence, femora and tibic with minute yellow and whitish impressed scales, often intermixed, the white ones predominating at base of middle femora and below hind Wings entirely clear, hyaline, subcostal cell yellowish femora brown, bifurcation of 2nd and 3rd veins exactly in a line with anterior cross-vein, which latter is just before iniddle of discal cell; halteres pale creamy yellow.

Length, 121 mm.

Described from the unique type in the Indian Museum from Bhura, in the plains of the Nami Tal District, Western Himalayas, 14-17, iv. 1907.

The differences distinguishing this variety from typical A. hottentotta of Europe are the clear wings, the wholly black-haired frons, the whitish scales on the face, and minor characters.

# 193. Anthrax paniscus, Rossi.

Bibio paniscus, Rossi, Fauna Etrus 11, p 256 (1790). Anthi az bimaculatus, Macquart, Suites à Buff 1, p 403 (1834). Anthi az cingulatus, Meigen, Syst. Besch. 11, p. 145 (1820). Anthi az hottentottus, Walker, List Dipt. Brit. Mus. 11, p. 259 (1849).

of. Head from narrow, at vertex less than one-twelfth the width of the head, widening to nearly one-third of the head at the antennæ, dull black, with abundant black hairs and dark orange scales; face not projecting over mouth, dull black, with long yellow or orange scales and some long yellow hairs; mouth-border with some black scales; erect inconspicuous black hairs on upper eye-margins and on face; mouth-opening long, black. Occiput considerably puffed out, slaty black, lower part with whitish scales, which become silvery and less numerous behind upper eye-margin; extreme back of occiput with dense short

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yellow pubescence. Proboscis long, narrow, labella brown, palpi long, narrow, black, concealed. Eyes with facets equal Antennæ black, basal joints with dense black bristly hairs, 3rd joint slightly brownish, in the shape of a blunt triangle, tip produced to a long point with a minute apical bristle Thorax dull black, with dense tawny scaly pubescence, which is thinnest on the disc, the latter bearing numerous adherent black scales and blackishtawny hairs; furry pubescence extending from shoulders to wingbase and along dorsal side margins and hind margin, posterior calli with three to six long yellow spines or bristles, and about five smaller ones above the wings, a snow-white patch of scales in front of the absolute wing-base, not easily visible; pleuræ with dense tawny pubescence, thinner and more greyish on the lower parts. Scutellum with closely-adhering black scales and pale tawny pubescence, a row of black bristles on hind margin, and some small yellow scales towards side margins. black, sides of first two segments rufescent; first four segments densely covered with tawny pubescence, paler and thuner on disc, the whole of which is covered with closely adhering black scales; side pubescence on 5th and 6th segments deep black, on 7th snow-white, the middle of the hind margin bearing black Venter black, with closely adhering black scales, and with pale yellow pubescence and some elongate black scales and long black hairs towards side margins, hind margins of 2nd to 5th segments with some pale scales, genitalia very small, orange. Legs dull black, coxe with pale yellow pubescence in front, more brownish behind, and bristly black hairs at tip; anterior femora with inconspicuous yellowish or blackish pubescence behind and beneath, hind femora with such at base only, pale scales on fore femora in front and behind, on posterior femora nearly over all the surface, and on basal half of posterior tibue and to a less extent on parts of the fore tibue, pulvilli Wings quite clear or very pale grey, indescent, base and fore margin yellowish brown down to 1st longitudinal vein or sometimes a little further, basal parts of veins black or brown; dense black scales on broadened base of costa, sometimes with some pale ones intermixed, occasionally a black spine at extreme base of fore margin; squamæ brownish yellow, margin darker, root black, fringe yellow or orange, halteres small, orange

Q. Pubescence sparser than in 3; 2nd, 3rd, and 4th abdominal segments with a band of pale scales. From at vertex one-eighth the width of the head, fully one-third at level of antenue, with more numerous golden scales than in 3. Silvery patch at wingbase absent. Abdominal pubescence longer, pale tutts at tip more yellowish than silvery, pubescence on disc thinner, a conspicuous band of golden scales on 2nd, 3rd, and 4th segments, the first one the widest, that on the 3rd segment the narrowest, all the bands narrower in middle; 6th segment with a narrow hind marginal band of scales, which is sometimes present on the 5th also; 7th segment with black scales on the disc, and yellow scales

and long yellow hairs on basal corners, besides conspicuous black pubescence. Venter black, white scales on 4th, 5th, and 6th segments, less abundant on 7th; hind margins of segments more or less with a narrow band of yellow scales and hans; ovipositor orange

Length, normally 12 mm., varying from 10 to 14 mm.

Nami Tal, 6000-7000 ft (R E Lloyd). One specimen in the

Indian Museum from Simla, x. 1906 (Lefroy).

The above description is an abbreviated one from Verrall, as the only Indian specimen and the three European specimens before me are in very indifferent condition, though there seems no doubt as to the identity of the species.

## 194 Anthrax dia, Wied.

Anthrav dia, Wiedemann, Anal. Ent. p 23 (1824); id., Auss. Zweifl. 1, p 293 (1828)

"d. Antennæ black (3rd joint missing). Epistoma and from sparsely, the vertex a little more densely clothed with grey hairs Occiput blackish, grev-haired, margins of eyes white. Collar grey, thorax with reddish-brown pile and grey hairs, mixed at sides with whitish hairs. Scutellium blackish, with traces of reddish-brown pile; sides of thorax with whitish hairs. The 1st abdominal segment with reddish-brown pile on the hind margin, with whitish hairs at sides, 2nd reddish brown with whitish band at base, 3rd with a narrow band across the middle, 4th with a very broad whitish band, so that only the reddish brown hind border remains, 5th and 6th whitish, only at the base narrowly reddish brown, 7th and 8th, on the contrary, only whitish at sides; venter blackish, with whitish hairs. Wings quite clear; brownish at extreme base and in the costal cell, the colour extending a little below this cell, halteres yellow. Legs black, with yellowish pile. Length 51 lines Tranquebar." (Werdemann)

Type in Westermann's collection.

# 195. Anthrax baluchianus, sp nov.

3 ♀ Head from a quarter to one-fifth, in ♀ onethird, as wide at vertex as at just above antennæ, black, covered with yellowish-grey depressed scales and erect long fine black hairs; ocelli dull reddish brown; face clothed similarly to from, but the scales longer and with yellow hairs instead of black; proboscis reddish brown, antennæ black, let joint with long black bristles, 2nd with shorter ones, 3rd elongate onion-shaped, with moderately long style, which becomes reddish brown towards tip, occiput covered exclusively with short depressed yellowishgrey scales Thorax blackish, dorsum covered with minute yellowish-grey depressed scales, a thick collar of long yellowish scaly pubescence on anterior margin; side margins and the whole of the pleure similarly clothed; sides of dorsal margins with long

yellow bristles and a bunch of them on each posterior corner, scutellum with depressed small yellowish-grey scales and a row of strong deflexed yellow spines on hind margin. Abdomen black, each segment closely covered (in good specimens) with very small greyish depressed scales, which occupy about the basal half or rather more of the first two or three segments, covering more and more of each successive segment till the last ones are nearly wholly covered, the remainder of the dorsal surface bearing small black closely-impressed scales, before the hind margin on each segment is a row of strong black bristles, the moderately long pubescence sometimes yellowish (in the type 2 it is wholly bright yellow on head, thorax, and abdomen), venter black, covered with depressed greyish scales and rather long concolorous fine hairs. Legs black, coxe with pale yellowish-grey depressed scales and long concolorous hairs, temora and tibie with a close covering of small overlapping yellowish-grey scales, both femora and tibiæ with rows of black bristles, tarsi with a little short rich brown pubescence on underside Wings practically clear, costal cell yellowish, the colour basally extending a little further hindward, another cross-vein just before middle of discal cell, a small bunch of short silvery-white scales at extreme base of costa and posterior to the strong black scales on the adjacent costal margin, halteres pale brownish cream-colour, hidden in the pubescence

Length, 13 min

Described from several specimens, mostly in interior condition, except the type  $\sigma$  and  $\rho$ , in the Indian Museum, from Baluchistan (Cleghon), and several others in good condition from Kashmir, 1915 (H. T. Pease) Bahisht Khal, 6 and 8.1x 1908 (Nadir Khan); Bhittain, on camel.

#### 196. Anthrax albofulva, Walk.

Anthrax albofulva, Walker, Ins. Saund., Dipt. pt. 3, p. 182 (1852), Brunetti, Rec. Ind. Mus. n., p. 454 (1909)

3 Q. Hend · from in both sexes at level of antennæ barely onethird width of head, less than one-fourth of that width at vertex in d. and half that width in Q, dark grey, with long, rather dense pale yellow scaly, almost bustly pubescence, and a space in the middle with long black similar pubescence; tace with similar pubescence, which is sometimes yellowish on upper part and white on lower part, or wholly snow-white throughout; antennæ black, first two joints with bristly yellow pubescence, 3rd joint elongate onion-shaped, with a minute pale style-like thick bristle at tip; mouth-opening very large, proboscis obscure, withdrawn, occuput dark grey, with more or less minute scaly pubescence round hind border of eyes. Thorax blackish, with minute yellow depressed scales on dorsum; anterior and side margins with pale vellowish-grey elongate scaly pubescence, which (apparently) is not dense, two or three long yellow spines on posterior corners, sides of thorax bluish grey, with nearly whitish pubescence.

Scutellum concolorous with dorsum, with minute vellow depressed scales and some longer pubescence and a row of yellow bristles on Abdomen dark grey or blackish, wholly covered with minute vellow depressed elongate scale-like pubescence, a large fan-shaped bunch of nearly white long scaly pubescence towards sides of 1st segment, extending inwards across the disc, sides of rest of segments with soft whitish outstanding hairs, groundcolour of sides of first five segments more or less orange or brownish yellow, the colour sometimes entirely absent. Venter varying from pale yellowish to dark grey, with darker marks, some depressed minute white scales and some longer whitish hairs; genitalia large, brownish yellow, with long pale hairs. Legs vellowish; coxe more or less bluish grey, with a little whitish pubescence; in the & the basal half of the anterior femora and nearly all the hind femora black, with minute whitish scales, in the Q basal half of fore pair narrowly at base in middle pair, and apical half or less of hind femora black, with minute whitish scales; apical third or half of tarsi in both sexes Wings clear, subcostal cell yellowish, 2nd longitudinal vein normally with a distinct upward curve, followed by a distinct downward one just before tip; anterior cross-vein at one-third (or a little beyond) of discal cell, placed some distance beyond tip of præfurca, anal cell rather narrowly open.

Venation rather variable: in one specimen from Allahabad the anal cell is very broad, and equally so for the whole of its length to the wing-boider, in others the degree of curvature on apical half of 2nd vein varies considerably, as does also the exact position of the anterior cross-vein in its relation to the discal cell

Length, 41-61 mm.

Described from several specimens of both sexes in the Indian Museum and Pusa collections.

Type in the British Museum (the head missing)

# 197. Anthrax aureohirta, Biun.

Anthraa aureohuta, Brunetti, Rec Ind Mus. iii, p 223 (1909).

3. Head from at vertex one-eighth width of head, widening to barely double this width at the level of the antennæ, black, slightly shining, occili on small raised tubercle; face black; some white dust on each margin of the lower part of from and of the face, and yellow and black short hairs intermixed above and below the antennæ, which are wholly black, the first two joints bearing some stiff black hairs, the third with soft white microscopic pubescence; proboscis somewhat large, blacksh at base, brownish towards tip, with some hairs; eye-margins rather deeply cut away at the middle of the side; occiput considerably puffed out, black, with golden-yellow hairs at the sides and a fringe of stiff bright yellow hairs at the back, and with microscopic black hairs on the remaining portions. Thorax black, with short, not thick,

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bright golden-yellow hairs, also a bunch of bristly yellow hairs on each side, just behind the shoulder, with some yellow bristles, some yellow hairs on anterior margin. A large reclinate yellow spine above each wing-base and three or four black bristles on posterior portion of dorsum Sides of thorax ash-grey, with some patches of whitish hairs, scutellium black, with golden-yellow hairs and some black bristles towards posterior margin. Abdomen moderately shining black, rather closely covered with short, bright golden-yellow hairs, which form a large fan-shaped bunch on each side of the 1st segment, where they become almost scaly, there are short black hairs intermixed with the yellow towards the sides of the dorsum, venter with close, soft, bright yellow hair. Legs coxe black, with whitish hairs; femora and tibin yellow, with short black bustles, which are longest on the latter and form a circlet at the tips of the tibie; tarsi black, with very short pubescence and bristles. Wings very pale brown up to just beyond the middle, where the colour fades away; halteres creamy yellow

Length, 5 mm.

Described from a unique specimen in perfect condition in the Indian Museum collection, from Calcutta, 1 vi. 1909.

This species does not fall quite naturally into any of my temporary divisions of this genus, as the darkening of the wing does not partake of the usual oblique form, the coloration extending over the whole basal half of the wing

#### 198. Anthrax clausa, Brun

Anthrav clausa, Brunetti, Rec. Ind. Mus 11, p. 477 (1909).

Head slightly broader than thorax and abdomen; from and face black, clothed with dense short black hairs; eyes distinctly separated at vertex, the ocelli being placed well forward, the frons widening very rapidly, until at the insertion of the antennæ it occupies half the width of the head Antennæ black; first joint cylindrical, second sub-spherical, much shorter than first, third onion-shaped, with long style, small, narrower, and shorter than second. Underside of face uniformly black, proboscis almost invisible; back of head dark grey, with a few whitish hairs. Thorax dull black; anterior border with a rather thick fringe of grey hairs, which apparently cover both doisum and sides Abdomen linear, with conical tip, of same width as thorax; dull black (denuded), probably when in good condition the whole abdomen is covered with whitish grey hairs. The present specimen has bunches of such hairs at the sides of the abdomen towards the base, also at the tip, the dorsum shows little traces of hair, and on it the hair is probably always sparser; at the sides of the abdomen towards the base are patches of all-black hairs; venter black, nearly bare Legs blackish, the inner sides of the anterior tibiæ with a brown tint, femora below with some soft moderately long blackish hairs; fore tibic with a single row of small black bristles, middle pair with a similar row on both outer and inner sides, and hind pair rather thickly clothed with them Wings clear; anal cell closed immediately before the border, discal cross-vein placed just beyond one-third of the discal cell; first posterior cell widely open, fork of the third vein showing a tendency to form an appendix, halteres cream-white; tegulæ small, dirty white, transparent, with a fringe of short grey hars.

Length, 81 mm

Described from a unique of in the Indian Museum from Moulmein, Lower Burma, in 1908 (Annandale)

The only species described from the East with the anal cell closed

The following species have been recorded from "East India," but may be regarded as requiring further confirmation. They are therefore not included in the table of species —

### 199. Anthrax troglodyta, F.

Bibio troglodyta, Fabricius, Syst Ent. p 759 (1775)

Anthrax troglodyta, Wiedemann, Auss Zweifl 1, p 306 (1828);

Wulp, Notes Leyd. Mus vii, p. 83 (1885); de Meijere, Tijd. v.

Ent. l, p. 240 (1907)

Anthrax hyalina, Wiedemann, Dipt. Exot 1, p. 141 (1821), 1d,

Auss Zweifl 1, p. 297 (1828), Wulp, Tijd v Ent. xxiii, p. 165
(1889).

Anthrax lucens, Walker, Ins. Saund, Dipt pt. 8, p. 180 (1852).

"Black, head tawny beneath chest and breast clothed with tawny hairs, a tuft of white hairs on each side above the base of the wing; abdomen obconical, a little shorter than the chest, clothed on each side with alternate patches of black and white hairs, legs clothed with very short black hairs. Wings colourless, dark brown at the base, adorned on each shoulder with a patch of silvery-white hairs; wing-ribs and veins black. Length  $4\frac{1}{2}$  lines, wings 12 lines East India." (Walker.)

Type in Fabricius's collection.

The above is Walker's description of lucens, which is said to be identical with troglodyta.

### 200. Anthrax lucida, Walk.

Anthraa lucida, Walker, Ins. Saund., Dipt. pt 3, p. 179 (1852).

"\$\times\$ Black, thickly clothed with bright tawny hairs; head clothed above with black hairs; abdomen nearly linear, truncated at the tip, hardly shorter than the chest; tip clothed with black hairs and adorned on each side with a tuft of yellowish-white hairs; wings colourless, brown along the fore border for two-thirds of the length; wing-ribs and veins black, the latter pitchy beneath the fore border; poisers yellow. The brown on the wing of this species is much narrower than that of A. manifesta. Length 6 lines, wings 14 lines. East India." (Walker.)

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### 201. Anthrax limpida, Walk.

Anthrax limpida, Walker, Ins. Saund, Dipt. pt. 3, p. 179 (1852).

"Black; head clothed above with short tawny, and longer black hairs, beneath with longer tawny hairs, chest clothed with bright tawny hairs; abdomen slightly obconical, somewhat truncated at the tip, shorter than the chest, clothed with pale tawny hairs, legs clothed with short black hairs, wings colourless, with a very narrow brown stripe along the fore border for more than two-thirds of the length; wing-ribs pitchy, veins black, pitchy at the base and along the fore border; poisers pale yellow. Length 5 lines, wings 12 lines East India." (Walker)

Type in the British Museum.

#### 202. Anthrax referens, Walk.

Anthrax referens, Walker, Ins. Saund, Dipt. pt. 3, p. 189 (1852).

"Black; head clothed with short ferruginous hairs, and on the crown with some black hairs; mouth pitchy, each side of the chest adorned with a stripe of white hairs; breast grey, clothed with ferruginous hairs Abdomen obconical, much shorter than chest, adorned towards the tip with two interrupted bands of white hairs; base clothed with pale tawny hairs; hind borders of segments clothed with short ferruginous hairs; sides adorned with alternate tufts of black and white hairs; underside ferruginous; legs pitchy, clothed with very short black hairs and bristles. thighs and shanks adorned with a tawny tinge. Wings dark brown from the base along the fore border to the tip and along the hind border to the end of the inferior part; this brown part includes a nearly colourless dot, and its outline has two deep and arregular inward curves, wing-ribs and veins black; poisers pitchy, with pale yellow tips. Length of body 4-41 lines, wings East India." (Walker.) 11-12 lines

Type in the British Museum.

# Subfamily LOMATIINÆ.

Profurca ending, that is to say, 2nd and 3rd veins separating, nearly opposite base of discal cell. Antenno more or less approximate at base; proboscis usually short, sometimes porrect; abdomen rather oblong, but not cylindrical. Head hardly transverse, closely applied to thorax; face generally produced, eyes in 6 approximate or contiguous, wide apart in 2; occiput generally puffed out. Thorax not humped, with few or no bristles; scutellium large, without strong bristles. Abdomen longer than broad, generally oblong, without bristles. Legs with few or no bristles, except spicules on tibiæ. Wings with 2nd vein and upper branch of 3rd strongly looped, more or less parallel to each other towards tips, anterior cross-vein placed considerably beyond iniddle of discal

cell, often sloping, two or three submarginal cells, four posterior cells, 1st either open or closed, anal cell generally open.

This subfamily is by no means properly understood, nor its

limits satisfactorily defined.

The present acceptance of it is in Verrall's sense, and only one genus with a single species is Indian.

### Genus APHŒBANTUS, Lw

Aphæbantus, Loew, Berl Ent Zeit xvi, p 253 (1872)
Triodites, Osten-Sacken, Bull U.S Geolog. Survey, iii, p. 245 (1877)

Genotype, Aphæbantus cervinus, Loew; by original designation.

Body and whole appearance Anthrax-like, wings long Bifurcation of 2nd and 3rd longitudinal veius at some little distance (but not greatly) before anterior cross-vein. From in & comparatively wide. Antennæ remote at base; 1st joint short, 2nd very short, 3rd short, more or less onion-shaped, with styliform prolongation, not separated by a sutuie, with or without a bristle at tip Labella large, fleshy Angulation of 3rd vein with or without appendix. Small but distinct pulvilli, generally a long bristle at end of hind metatarsus.

Range. All the previously known species come from North America, except one occurring in Central America.

At the time of describing Argyramæba ceylonica the possibility of it being an Aphæbantus did not occur to me, as the genus was unknown from any part except North America and a single species from Central America. An unnamed specimen of my species in the British Museum, labelled "? Aphæbantus," first called my attention to the genus, but no authenticated specimen definitely referred to the genus has been available for comparison, so I adopt it with some hesitation.

The species agrees with Osten-Sacken's characters of the bifurcation of the 2nd and 3rd veins, occurring at "some distance before" the anterior cross-vein, as a matter of fact, it occurs in a line with or just beyond the base of the discal cell. The antennal 3rd joint shows no sign of any pencil of hairs, but a suture (about as far from the tip as in Argyramæba) is more or less obvious under a microscope in all the twenty or more specimens, mostly in good condition, examined, and the minute bristle at the extreme tip is apparent. This, however, is hardly my interpretation of Osten-Sacken's words "a minute, sometimes scarcely apparent joint," which seems to refer rather to size than distinctness of outline.

A. ceylonicus is admitted to Aphabantus herein on the strength of the proximal bifurcation of the 2nd and 3rd veins, in conjunction with the absence of the antennal pencil of hairs.

The existence of my Argyrameba intermedia and a probable second closely-allied species with nearly clear wings somewhat

complicates matters, as these two forms possess a distinct pencil of hairs, whilst the bifurcation of the 2nd and 3id veins takes place half-way between the base of the discal cell and the anterior cross-vein, its exact position not being constant

## 203. Aphæbantus ceylonicus, Brun

Argmanacha coylonica, Brunetti, Rec Ind Mus. ii, p. 471, pl xii, fig. 24 (1909)

3 2. Head from in 3 at vertex very narrow, one-fifth or one-sixth of its width at level of antennæ, where it is less than a third the width of the head and widens from the vertex very rapidly; from in 2 one-third as wide at vertex as it is at level of antennæ, where it forms less than one-third of the head, froms and face dark grey, face sometimes lighter, covered rather densely with bright vellow elongate scaly pubescence, which is generally paler on face, even whitish or quite white; antennæ black, 3rd joint onion-shaped, with a moderately long style, basal joints with black bristles; proboscis brownish, withdrawn, occiput ash-grey, much puffed out behind, especially in the 2, covered with minuto impressed bright yellow scales; side indentation of eye-margins very considerable Thorax black, dorsum covered thickly with very minute bright yellow depressed scales and scale-like hairs, and with long pale yellow hairs rather thinly interspersed; a collar of very long elongate pale yellow scales on anterior margin. a bunch of slightly shorter and paler ones on shoulders; several large yellow spines in front of wing-base and on posterior corners of dorsum, and a row of yellow bristles towards hind margin; sides of thorax ash-grey, with a bunch of pale yellowish pubescence below shoulders, also in front immediately below head; sternopleure with silky white pubescence; scutellum with yellow pubescence as on thorax, and a row of yellow bristles on hand Abdomen normally with middle part longitudinally to a greater or less width black, remainder of dorsum brownish yellow: often the black colour covering nearly the whole surface, whilst sometimes reduced (at least on anterior half of abdomen) to the middle third; hind margin of abdomen more or less yellowish; 1st segment mainly black, yellowish towards sides, with a thick bunch of yellowish scales covering each outer third, leaving the middle third bare : hind margin with minute bright yellow scales ; whole surface of abdomen covered with minute bright yellow semi-depressed thick hairs, with longer black thin hairs interspersed, sides of abdomen with moderately long thin pale yellow hairs, no trace of scales Venter yellowish, more or less blackish in middle or towards base, sometimes nearly all blackish, covered with minute yellow pubescence; genitalia brownish yellow, mainly concealed. Legs coxe ash-grey, with long whitish pubescence; femora and tibre yellow; about apical half of anterior tars and all the hind tarsi black, at most the latter a little pale at base in individuals, hind femora with a row of black bristles behind, all tibes with the usual rows of small black bristles; hind femora with a number of small black bristles on upperside at tip, giving the appearance of the tip being blackish. Wings nearly clear, costal and subcostal cell yellowish or dusky, the colour sometimes extending a little posteriorly, or in some specimens faintly or more distinctly across the wing, even to the hind margin, tip of wing generally clear, 2nd longitudinal vein rather deeply looped towards tip, upper branch of 3rd vein with or without appendix; halteres mainly yellow.

Length, 5-8 mm.

Redescribed from several of each sex in the British and Indian Museums and the Pusa collection. Kalimpong, Daijiling District, 800-4500 ft., 24.1v.-10.v.1915 (Gravely), Allahabad, 21-29. iii. 1906 (Howlett), Pusa, Bengal, not uncommon, 1, 1ii, vii, xi, parasitic in cells of Pseudagema clypeata (G. R. Dutt), Chapra, Bengal; Calcutta, 4. iv. 1913 (Gravely), 1. vi 1909; Kandy, v. 1892 (Yerbury); Heneratgoda, Ceylon, 26. vi 1892 (Yerbury); Pundaluoya, Ceylon (Green)

Types in the Indian Museum

This redescription varies somewhat from the original, but must be taken as an improved one, built on the study of considerably

more specimens, mostly in good condition.

Description of the pupa-case. Pale yellowish, 10-segmented, the 1st with a brown prolongation, bearing six very strong blunt black spines arranged two in an upper and four in a lower row; two similar but much smaller black spines in middle of underside of segment, 1st segment smooth and bare, 2nd similar, but with three or four very long filamentous pale yellow strong curved hairs on each side, 3rd segment bare, except for a row placed just behind front margin, of very long, closely-placed, similar curved hairs, which are almost spine-like at base, but taper gradually so that the major portion is flexible; there are also three very long yellowish similar bristly curved hairs (their bases not spine-like) on each side of the segment. Dorsum of each remaining segment with a transverse row, placed at about middle of segment, of twelve or more strong bright brown hooks, about three-fourths of the length of each being fixed to the surface, and the tips curved upward and forward, evidently designed to hold the pupa-case tightly, enabling the imago to draw itself free and These hooks are largest in the middle of the row, and escape gradually diminish in size towards the sides, where are several very long bristly hairs as on 3rd segment; also between each two hooks, its roots near the upturned portion (of the hooks), is a similar rather shorter (though still actually very long) bristly curved hair. On 4th, 5th, and 6th segments the hooks are very large and strong, on the 7th considerably smaller, and on the next three segments smaller still; but the long bristly pale yellow hairs are equally long on all the segments, except the 10th, on which they are distinctly shorter. Tip of 10th segment formed

into a blunt cone with two short strong brown blunt spines at extreme tip and a similar smaller spine above them, placed a little anteriorly. Venter with a transverse row of moderately long pale hairs placed behind the middle of each segment.

Length, 10-12 min, measured along dorsal line from tip to tip,

probably variable.

# Subfamily BOMBYLIINÆ.

Mead smaller than in Anthracine, rarely transverse or wider than thorax; back of head much puffed out; eyes contiguous or subcontiguous in &, distinctly separated in 2; if wide apart in d, then abdomen short and broad. Antenne approximate at base, variable in structure, with an apical style of variable form, sometimes imperceptible. Proboscis variable in length, generally elongate and porrect Thorax generally well, often considerably, arched, usually with dense furry pubescence, in some genera nearly bare Abdomen usually short, broad and rounded, rarely conical; frequently with dense furry pubescence. Legs generally long and thin, sometimes bare or apparently so, often with sticklike spines below the femora, or with spicules, or with a circlet of apical spines to the tibiæ 'I'wo pulvilli Wings with the praefurca short, one to three submarginal cells; three or four posterior cells, 2nd and 3rd longitudinal veins usually emerging at an acute angle, the latter approximately opposite base of discal cell, 3rd vein nearly always forked, discal cell larely absent. anal cell open or closed

This subfamily differs from the ANTHRACINE by the divergence of the 2nd and 3rd veins at an acute nigle at some distance before the anterior cross-vein, from the TOXOPHORINE and SISTROPINE by the short rounded abdomen, and from the LOMATHINE (less distinctly) by the rounder abdomen, the longer

proboscis, and less upturned 2nd vein

#### Table of Genera.

1.	One submarginal cell only	Empirious, Beck.,
	Two or more such cells	2 [p. 260.
2	Four posterior cells	3
	Three posterior cells	7.
3	First and second antennal joints sub-	
	equal	Phthiria, Mg, p. 284.
	First antennal joint much longer than	
	2nd	4.
4	First basal cell distinctly longer than	
	First basal cell distinctly longer than 2nd; anterior cross-vein towards or	
	at middle of discal cell	5.
	The two basal cells subequal, through	•
	anterior cross-vein being near base of	
	cell	6.
5.	First posterior cell closed	Bombylius, L., p. 261
	First posterior cell open	Discristus, Lw., p. 273.
	-	8.2

6. Underside of head moderately pubescent. Underside of head densely pubescent

7 Abdomen rather long, control, or narrow, eyes in d contiguous, scutellum more or less triangular.

Abdomen short and broad, eyes in d generally narrowly separated, scutellum shorter and broader

Systechus, Lw., p 275 Anastrichus, O.-S., [p 278

GERON, Mg, p 279

Usia, Lati, p 281

#### Genus EMPIDIDEICUS, Beck

Empididencies, Becker, Zeits. f. Hymen. ii Dipt vii, p 97, fig (1907)

GENOTYPE, Empididencus carthaginiensis, Beck.; by original designation.

Very small bare species Head placed low on the thorax, antennæ with 1st joint microscopic, 2nd extremely short, 3rd comparatively large, elliptical, with small apical thickly pubescent style; occiput more or less puffed out. Thorax considerably Abdomen of six distinct segments Legs simple, moderately long, bare. Wings with distinctive venation iliary vein short, ending free, 1st vein ending at about middle of costa, 2nd vein absent (genotype) or present (indicus), when present, very short, turning sharply upwards and ending in 1st vein near its tip, 3rd vein simple, ending at some little distance before wing-tip; 4th vein forked, sometimes indistinct on the portion dividing the basal cells, 5th vein forked, base of upper branch forming lower side of 2nd basal cell; 6th vein attaining wing-border; anterior cross-vein present, discal cell absent; one submarginal, three posterior cells; anal cell open; squama absent.

Allied to Glabellula, Cyrtosia, and Apolysis, only one other species (from the Tunisian coast) except indicas being known.

# 204. Empidideicus indicus, Brun.

Empididencus indicus, Brunetti, Rec Ind Mus. vii, p 77 (1917).

Q Head from apparently about one-fourth width of head, yellowish; antennæ black; probosom more than 1½ times height of head. Thorax black, practically bare, humeri bright yellow. Abdonen black, hind margins of segments pale yellow, and a transverse yellow line across middle of 1st and 2nd segments. Legs black, knees and tips of tibiæ yellowish. Wings pale grey; auxiliary vein short, ending free, 1st vein ending at middle of costa; præfurca beginning at middle of 1st vein; 2nd vein very short, directed abruptly upwards, ending in 1st vein near tip; 3rd vein in line with præfurca, simple, ending a little before wing-tip; 4th vein forked at half its length after quitting basal cells, the section dividing those cells hardly less distinct; 5th vein forked, base of upper branch forming lower side of 2nd basal

cell, 6th vein reaching wing-border; 1st basal cell a little longer than 2nd, bifurcation of præfurca opposite tip of 2nd basal cell *Length*, 1 mm.

Described from four paratype specimens in the Indian Museum in very indifferent condition, taken by Dr Annaudale at Simla, 7000 tt, 16. v. 1909, on flowers of white stonecrop, and 7 v 1910, also at Simla.

The species conforms to all the generic characters except in the presence of the 2nd ven, which, according to Becker, is anastomosed with the 3rd. In his species, also, the basil cells are equal in length, and he does not mention the auxiliary ven, which, however, is easily overlooked in *indicus*. Temporarily, at least, the species may be located in this genus. Verrall figures the wing of this genus (Brit Flies, v, p. 484, fig. 272).

### Genus BOMBYLIUS, L.

Bombylus, Linnœus, Syst Nat Ed v, p. 606 (1758), Brunetti,
 Rec Ind. Mus. n, p. 456 (1909)
 Parisus, Walker, Ins. Saund., Dipt. pt. 1, p. 197 (1852)
 Choristus, Walker, Ins. Saund., Dipt. pt. 1, p. 196 (1852).

GENORYPE, Bombylius major, L , by designation of Latreille,

Hrad small, semicircular, set rather low and closely applied to thorax, face short, densely pubescent from in 2 with long pubescence or scales; three ocelli, eyes elliptical, bare, contiguons in d, wide apart in Q, without an indentation at middle of hind margin. Proboscis very long, thin, pointed; labella small. Antenna porroct, approximated at base; 1st joint much longer than 2nd, with long stiff hans, 2nd short, cup-shaped, 3rd clongate, variable in shape, conical, peg-shaped, long strap-shaped, or rarely leaf-like, occasionally with dorsal scales, style jointed, terminal. Thorax oval, short, considerably arched, with dense furry pubescence, sometimes distinct presutural bristles present Scutellum broad, semicircular, clothed as the thorax, occasionally with scales only. Abdomen rounded, short, well arched, 7 segmented, the terminal ones withdrawn, all with dense fury pubescence, often with longer and more bristly hairs intermixed. Legs long and thin, bearing spicules; hind legs elongate, hind femora often with stiff bristly spicules below; all tibie with rows of minute spicules and small terminal spurs; pulvilli distinct, empodium ininute. Wings at rest, outspread, rather narrow, subcostal cell very narrow; 3rd vem forked; anterior cross-vem at or before middle of discal cell, erect; two submarginal and three posterior cells, all open; 1st basal cell always longer than 2nd, but sometimes only a little longer; anal cell narrow, open The wings often prettily marked either with spots or the diagonal base-costal band so common in this family.

Range. World-wide; a very large genus.

Life-history of a few European species partially known, the

larvæ preying upon the larvæ, and perhaps pupæ also, of small bees (Andrena, Halictus, etc.) \* The larva and pupa of Bombylrus major, L., has been obtained from the nests of Andrena. The pupa of Bombylrus has cephalic spines which act as digging organs,

organs.			
	Table of Species		
1.	Wings with narrow black band at base and a brown suffusion across middle, abdomen with bright red pubescence, and white pubescence at trp, length		
	10-18 mm	orumtalis, Macq, p 263	
	Wings without suffusion across middle, abdomen never as above	9	
2	Wings wholly dark brown except hind boider, where the colour fades away, abdomen in 3 with silvery-white, in Q with fiery-red pubescence, length	-	
	4-5 mm	wulpu, Brun, p. 204.	
	Wings clear, with dark blown band on	1 , , 1	
	fore border, a regular in width, reaching		
	nearly to tip on costa and posteriorly		
	nearly to middle of wing, length 8-12 min	Alleron T 905	
	Wings clear, or at most brownish or	major, L., p. 205.	
	brownsh yellow at base, the colour		
	never extending more than half across		
_	wing (in propingues only)	8.	
3.	A conspicuous row of erect black spines on		
	hind border of abdominal segments, length 8-12 mm	erectus, Brun., p. 267.	
	Abdomen without such spines, length at	crecem, 15tun, p. 2011	
	most 6 mm	4.	
4.	Legs black, head with silvery-white		
	han-spots†	5	
r.	Legs pale yellow	6	
υ,	Third antennal joint twice as long as 1st and 2nd together, extreme base of		
	wing dark blown, subcostal cell pale		
	yellowish	maculatus, F., p. 267.	
	Third antennal joint subequal to 1st and		
	2nd together, wing practically clear,		
	only extreme base and the subcostal	comunities Desire in 6000	
ß.	cell very pale yollowish First antennal joint pale yellow , Srd joint	comustes, Brun., p. 268	
٠.	nearly double 1st and 2nd together;		
	anterior cross-vein at one-third of		
	discal cell; 1st basal cell very little		
	longer than 2nd, only 1st basal cell and	1.1 15	
	subcostal cell very slightly brownish	vicinus, Brun., p 270.	
	Antennæ all black	7.	

<sup>\*</sup> See Verrall ('British Flies,' v, p 502) for interesting notes on the habits of B. canescens, a European species.

† B albosparsus, Big, comes here, but I cannot define it more nairowly.

7. Snow-white pile and hairs at tip of abdomen; 3rd antennal joint nearly double as long as 1st and 2nd together.

No white hairs on abdomen

No white hairs on abdomen

8 Wings clear, brown at base, nearly up to
anterior cross-vein

Basal half of wing diagonally brown, the colour dying away gradually .....

terminalis, Brun., p. 270.

fulmpes, Big , p. 271.

propriques, Brun., p. 272.

In comparisons between the length of the proboscis or abdomen relatively to that of the thorax the scutellum is not included.

### 205. Bombylius orientalis, Macq.

Bombylius or ientalis, Macquart, Dipt Exot II, pt 1, p. 90, pl. vi, fig 2 (1840), Brunetti, Rec Ind Mus II, p 456 (1909)
Bombylius tricolor, Guérin, Icon Règne Anim. III, p. 538, pl. xcv (1829-1838)

3 9 Head. in 3, vertex very small, black, with black hairs, from and face black, former with long whitish or yellowish-white hairs, similar hairs adorning each side of the face; lower part of head devoid of pubescence, occiput with brownish-yellow hairs. Antennæ black, 3rd joint twice as long as 1st and 2nd together, tapering, 1st joint with long grey hair above and below.

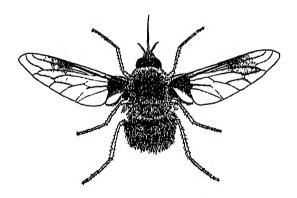


Fig 14.—Bombylius orientalis, Macq

Proboscis black, as long as from the frons to hind border of thorax; palpi brownish black. In  $\mathfrak Q$ , frons about one-third the width of the head, slightly narrower above, with greyish pubescence, in all else as in the  $\mathfrak G$ . Thorax and scutellium closely covered with rather short brownish-yellow pubescence. Abdomen black, with thick yellowish-grey hairs towards sides and at base, and with the tip covered with whitish hairs; the remainder of the dorsum covered with fiery-red or orange-red hairs; the pubescence in the

median line of the hinder part of the abdomen much thinner; the pubescence extends thickly over the sides, the central space of the ventral surface bearing short grey pubescence black, hind femora with some rows of short black bristles below; anterior femora with some short soft hairs below, very small bristles on all tibiæ. Wings pale grey; a narrow basal black band not reaching as far distally as the humeral cross-vein and the alulæ, a broad, rather pale brownish, distinct but ill-defined band across middle of wing from costa nearly or quite to hind border, beginning before the anterior cross-vein and ending about level with the tip of the 2nd longitudinal vein; costal and subcostal cells a little brownish; halteres black.

Length, 13-15 mm.

Redescribed mainly from three of of in good condition in the Indian Museum from Anwarganj, Cawnpore Distr., 1-13 x. 1911 (Caunter); Coorg, S. India (Hannyngton), and Karikkuppaur, S. India, 2500 ft, 21. x. 1910 Other examples are from Dehra Dun, ix. 1913 and x. 1914 (Chatterjee), 9. vii. 1913; Palamow, Bengal, Chapra, Bengal, common (Mackenzie), Bangalore; Ranchi; Hadagalli, Cevlon

Type in the Paris Museum

## 206. Bombylius wulpii, Brun.

Bombylius wulpi, Brunetti, Rec Ind. Mus 11, p 457 (1909), id.,

op cit 111, p 26 (1909)

Bombylius pulchellus, Wulp (nec Loew, 1803), Tijd v Ent xxin, p. 164, pl x, fig 8 (1880)
Comastes pulchellus, Wulp, Cat. Dipt S. Asia, p. 74 (1896)
Eucharumyia dives, Bigot, Bull. Soc Ent France, (6) viii, p. cxl

(1888)

Bombylius scintillans, Brunetti, Rec. Ind. Mus 111, p. 224 (1909)

d ♀. Head in ♂ nearly as broad as thorax, black; eyes contiguous for about half the distance between vertex and antennæ, upper facets much larger than and divided clearly from lower ones, eyes reddish or dark brown; vertex distinct, ocelli red, antennæ black, 3rd joint nearly double as long as 1st and 2nd together, long bushy black hairs on 1st joint, clypeus shining dark brown or blackish, the centre part devoid of pubescence; a small conspicuous spot of silvery-white scales on each side of the antennæ and another larger one on each side of the face; proboscis black; occiput blackish, with bushy bright vellow hairs on upper part and long black hairs on lower part. In Q, frons nearly one-third of the head, a little narrower above, black, covered with bright deep yellow scaly hairs or scales; four white scale-spots on head as in o, occiput with bright yellow pubescence; face nearly bare. Thorax in & deep black, with black pubescence, the anterior part of dorsum with bright yellowish hairs; scutellum black, with long black hairs, a white scale-spot just behind each humerus. In 2, dorsum and

scutellum with fiery reddish-yellow scaly hairs and a few black bristly hairs along sides of thorax and on scutellium. Abdomen in & dull shining black, with some long black hairs on 1st segment and on the wholly black venter, remainder of dorsal surface covered closely with shining silvery-white scales abdomen covered with fiery reddish-vellow scaly hairs, a small white scale-spot at the sides of both 2nd and 4th segments; Legs black, anterior lemora with short remainder as in 3 soft black hairs below, hind pair with some rows of small black bristles below; tibio with numerous small bristles deep smoky brown, nearly black at base and on basal part of costa, hind border paler, the colour dying away gradually, a blackish spot at upper angle of 2nd basal cell, halteres black Anterior cross-vein distinctly before middle of discal cell. 1st basal cell distinctly longer than 2nd.

Length, 4-5 mm.

Redescribed from several specimens from Dehra Dun, vi 1913 vi 1914 (Chatterjee), Bellary, 30 viii. 1912, Cheria Island Chilka Lake, Orissa, 21. viii. 1914, Talewaddi, N. Kanara Distr. 3-10. ix. 1916 (Kemp), Kulattupuzhi, Travancore, 19. xi. 1908 and Tenmalai, Travancore, at light, 22. xi. 08 (Annandale), Param bikulam, 1700-3200 ft., Cochin State, 16-24 ix. 1914 (Gravely) Madulsima, Ceylon, 19. i. 1909, and 9 viii. 1908 (T. B. Fletcher) Kandy, viii. 1892 (Green). Hambantota, Ceylon, 12. i. 1908, Maru thamalai Lashio, Upper Burma, 3000 ft., 23, 24. viii. 1914 (Fletcher)

# 207. Bombylius major, L.

Bombylus major, Linneus, Syst Nat. Ed x, p. 606 (1758)
Fubricius, Syst Antl. p. 128 (1805), Meigen, Syst. Besch i
p. 190 (1820), Macquart, Hist. Nat. Dipt. i, p. 377, pl. i
iigs 9, 10 (1834), Schiner, Faun. Aust., Dipt. i, p. 60 (1862)
et auet. plur.\*

Bombylius sinuatus, Mik, Monog Bomb Bohem. p. 35, pl. xi, fig. (1796).

Bombylius varregatus, De Geer, Ins. ed Goeze, v., p. 107, pl. xi. fig. 10 (1782)

o. Head with vertex greyish black, triangular, elevated, willong black hairs, from brownish grey, with a middle furrow, as long dense hair, which is black on upper part but becomes light brown near the antenne, also with short pale brown depress pubescence between the from and the cheeks, face mainly wildense brownish-yellow hairs and a few black ones intermixed; the pubescence near the eyes black, lower part of head with dering whitish pubescence, eves contiguous for some distant occiput much puffed out, with dense dark tawny pubescence a fringe of long black hairs posteriorly. Antennæ black; 1st journel times as long as 2nd, with long black hairs; 2nd cup-shap dusted with light grey, tip ferruginous, 3rd twice as long as 1

<sup>\*</sup> Vids Kertész, Kat. Dipt , for copious references.

rather flattened, style very short, 2-jointed. Proboscis blackish, as long as from tip of epistome to tip of scutellum. Thorax black, with dense erect pale tawny pubescence, varying in appearance according to the line of vision from greyish yellow to yellowish brown, the pubescence paler above and behind the wing-base, no black hairs on upper surface of dorsum. Upper part of plenne with dark rufous-tawny, nearly black, pubescence, narrowing in width towards wing-base; lower part of pleuræ with a narrow band of whitish pubescence, below which the pubescence is black Scutellar pubescence concolorous with that of dorsum Abdomen black, with long dense brownish-orange pubescence; sides of 3rd segment with black pubescence, which is broader anteriorly, extending across the venter, isolated long black hairs on hind margins of 2nd, 3rd, and 4th segments; 4th and remaining segments with numerous black hairs, scattered irregularly. Venter with whitish pubescence, crossed by the transverse band of black hairs on 3rd segment, and with a similar median longitudinal Legs dull orange, coxe and trochanters black, fore femora (except narrowly at tip), basal half of middle pair, and basal third (less on upper side) of hind femora black, taisi blackish, but pale on first two joints for a greater or less distance; fore coxe with long dense brownish-white pubescence, middle pan with less dense and darker pubescence, hind pair with blackish pubescence, femora with long but not dense blackish pubescence on about basal half, also with shorter greyish pubescence merging into adpressed almost scaly pubescence; hind femora with a row of about eight long black bristles on basal half below, and smaller ones on apical half; fore tibic with three posterior pairs with four rows of 12 to 20 small black bristles in each row; fore tibin with three, middle pair with five, hind pair with a circlet of small black spurs, tarsi minutely bristly; pulvilli durty whitish, empodium reduced to a minute spine, claws rather long, black. Wings clear, with an oblique base-costal band covering the whole of the base, and extending distally in gradually but irregularly diminishing width, ending at about tip of 2nd vein. Roughly speaking, the hind border of the darkened part emits four short but not conspicuous extensions with sloping sides respectively over the alula, over upper branch of 5th vein, up to about middle ot 1st posterior cell, and just before tip of 2nd vein, alar squamin brown, margin darker, with long fringe, halteres small, orange, knob black.

Q. Mainly as the d. Frons at widest part about half width of head, narrower above, with long thin yellow hairs and short adpressed scaly pubescence, which latter is absent on the centre part and for a transverse space above antennee; upper part of frons with short brownish pubescence and long black hairs. The stripe of dark hair across the lower part of pleurs paler than in d, seldom blackish. The black bristles on hind borders of abdominal segments more conspicuous; anus with an outer ring of black and an inner fringe of short tawny ones.

Length, 8 to 12 mm.

The above description is compiled from Verrall's in his 'British Flies.' Typical specimens occur in the Himalayas in April and May, with others exhibiting minor variations, and the species is not at all uncommon in the Simla Hills.

### 208. Bombylius erectus, Brun.

Bombylius erectus, Brunetti, Rec Ind. Mus iii, p 480, pl. xii, fig 27 (1909)

3 ♀. Head from covered with short bright yellow hairs, with two arched lows of stiff black bristles, one just above, the other just below, the antennæ, and reaching from eye to eye, sides of tace with rather long, silky, cream-coloured hair; lower part of face light grey, with long snow-white hair, mouth-border reddish. antenne black, back of head with yellow hairs, eyes bare, distinictly excavated behind in the middle Thorax cinereous black, with (in semi-denuded condition) traces of a thick yellow pile, an elongated bunch of strong black bristles at the side, in front of the wings, sides of thorax with long greyish-white hairs, and vellowish hairs immediately below the wings Scutellium ferruginous, black at base, with a row of strong black bristles round the posterior edge, with yellow hairs below it; dorsum with yellow hairs. Abdomen apparently blackish brown, thickly clothed with vellowish and whitish hairs, which are generally yellowish on the basal segments and apical one, and generally whitish on the others, but variable; sides of 3rd and 4th segments with thick tufts of white hairs, and the sides of the 5th segment with a tuft of black hairs, posterior borders of 2nd and subsequent segments each with a low of closely-placed, black, strong, erect spines, forming two arcs when viewed from behind, venter blackish, dorsum of segment with white pile, some black spines towards the tip. Leys blackish brown, with small spines and a silvery sheen seen 111 certain lights Wings absolutely clear, extreme base slightly tawny, a small row of black bristles at base of costa; tegulæ pale vellow, with a narrow fringe of yellow hairs; halteres light brown

Length, 8-12 mm.

Described from thirteen of and twelve Q Q from Bangalore. Types in the Indian Museum collection; co-types in the British Museum and my collection.

# 209. Bombylius maculatus, F.

Bombylius maoulatus, Fabricius, Syst. Ent p 803 (1775); Wiedemann, Auss. Zweifl. 1, p. 342 (1828)

of Q. Head in o black; eyes contiguous for nearly one-third the distance from vertex to antennæ, leaving a rather large vertical triangle bearing a few black hairs; the ocelli large, red, well separated; trons with elongate white or yellowish-white scales; face clothed with long snow-white bristly hairs; antennæ

black, 1st joint about 21 times length of 2nd, with some line yellowish-white hans, 2nd with very tew short black bristles, 3rd more than double length of 1st and 2nd together, underside of head with soft snow-white hairs, occiput with long snow-white scales. In Q, from forming one-third of head at level of antennae, barely narrower at vertex, covered, as face is also, with long snow-white scales, intermixed with long white or yellowish-white bristly hans. Thorax black, a pair of faint bluish well-separated narrow stripes visible on the denuded surface, dorsum covered towards all sides with narrow flat-lying hair-like scales, and a further clothing of long scale-like bristly snow-white pulescence; probably in perfect specimens the whole dorsum thus covered, possibly less densely in middle, a large fan-shaped bunch of bristly white hairs behind and below wing-base. Scutellum large, subtriangular, apparently clothed like thorax. Abdomen black, with microscopic flat-lying black scales and a row of dark brown bristly hams on hind margins of 2nd and 3rd segments, intermixed on 3rd segment with long yellow bristles, 4th and 5th segments with yellow bristles on hind margins; from the 2nd segmentonwards a large patch of small snow-white scales at the base towards each side, and from at least the 3rd segment onward a similar patch in the middle of each segment's hind margin, at sides of 2nd segment (behind the white scale-spot) and extending over the whole side of the 3rd segment (beyond the white scalespot) a bunch of long dark brown bristly, almost scale-like, pubescence, black hairs surround the tip of the abdomen black; coxe with long whitish bristly hairs in front, femora more or less clothed with white scales, tibic with traces of them Wings clear; costal cell yellowish, whole base of wing as far as humeral cross-vem dark brown, some white scales at base of costa in addition to the usual patch of dark brown ones; thoracic squame dark brown, with a long fringe of snow-white briefly pubescence, alar squama and adjoining hind margin of wing for a short distance with small pale brownish or yellow scales; halteres black

Length, 6-7 mm

Redescribed from one of and two Q Q in the Indian Museum from Chatrapur, and Balighai, near Puri, 16-20, viii. 1911. Specimens seen from Bellary, 31 viii 1912, and Coimbatore, S India, 1 vii & 7, viii 1912 (Fletcher).

Type in Fabricius's collection.

# 210. Bombylius comastes, Brun

Bombylus comastes, Brunetti, Rec. Ind. Mus 111, p. 225 (1900).

3. Head with eyes contiguous for a short distance (about 10 facets); vertex blacksh grey, with erect long stiff black hairs, ocelli shining brownish yellow, from densely covered with long black bristles, a small patch of elongate snow-white scales on each side contiguous to upper eye-margin, face with long black bristles

and an elongate patch of very long snow-white scales running somewhat diagonally across each side from eye-margin nearly to centre of face, antennæ black, 1st joint with long bristly pubescence, mouth-opening large, grey, with some short pale hairs on margin; proboses black, as long as abdomen, occiput black, some small snow-white scales on eye-margins; vertex with a bunch of long black hairs. Thorax velvet-black, with a thick collar on anterior margin of elongate vellowish scales, rest of dorsum with very dense dark brown pubescence of moderate length, some whitish pube-cence along hinder margin. Scutellum covered with very small scales, which appear bright emerald-green or pale violet according to the direction of the light A tuft of long snowwhite scales behind wing-base Abdomen black, with (apparently) long dark brown bristly pubescence on dorsum towards and on sides, where it becomes much longer, thicker, and almost scaly; a small tuft of snow-white scales towards sides at base of 2nd segment, 4th segment with a bunch of very long snow-white scales towards each side at base, and a smaller bunch in centre on hind margins of 4th, 5th, and 6th segments. Venter black, with rather long soft whitish hairs in the centre and (apparently) some small snow-white scales, rather bare towards sides, but the very long pubescence of the dorsum and actual sides of the abdomen curve under the venter to some extent Legs dark brown or black; coxe with yellowish-grey hairs, femora and tibiæ with numerous small glistening snow-white scales, soft hairs below anterior femora, hind femora and posterior tibiæ with spiny Wings quite clear, costal and subcostal cells yellowish; halteres black, squame yellowish, with short white fringe, veinlet closing 1st posterior cell in a straight line with discal cross-vein

2. Head as broad as thorax, from dark olive-brown, distinctly but not greatly narrower at vertex than at level of antennæ, where it forms one-third the width of the head, apparently covered in good specimens with small snow white scales, face with long brilliantly snow-white scales, 1st antennal joint with rather long black pubescence, softer than in o, two oval callus-like elevations on froms, contiguous to eyes and vertical triangle; occuput more thickly covered with longer snow-white scales than in o, ocelli bright red. Dorsum of thorax covered with very small, brilliantly shiming, emerald-green depressed scales with violet reflections, a patch of small snow-white scales behind the humerus and below the wing-root, two or three such patches of scales on pleura; with rather long yellowish pubescence intermixed; dark brown pubescence of dorsum sparse; scutellum covered with small emerald-green scales with violet reflections and some rather long black pubescence. Abdomen black, whole surface closely covered with very small brilliantly shining violet scales, showing a bronze tint in certain lights, also a row of stiff black hairs towards hind border of each segment. In all else as in d.

Length, & 7-8, \$ 5 mm.

Bedescribed from two  $\sigma$   $\sigma$  and one  $\circ$  in the British Museum from the Bombay Presidency (E. B. Fry), and the original type in the Indian Museum.

## 211 Bombylius albosparsus, Big.

Bombylius albospai sus, Bigot, Ann. Soc Ent France, (7) lxi, p. 362 (1892)

3. Antennæ black, facial pubescence thick, silvery white; froms black, with silvery pile, and two small tufts of the same colour. The whole body velvety black, anterior part of thorax with dense short grey pubescence. Abdomen with numerous white hairs intermixed, tip with long thick white hairs. Halteres and legs black; wings nearly clear.

Q (denuded) like of. Frons wide, with four spots formed by silver pile, proboscis longer than head and thorax together.

Pondicherry. Length,  $5\frac{1}{9}$  mm Type in the Bigot collection

### 212. Bombylius vicinus, Biun.

Bombyhus vicinus, Brunetti, Rec. Ind. Mus 11, p. 480 (1909).

Q. This species is so closely allied to terminalis that I had almost decided to regard it as the Q of that species. The differences, however, appear sufficient to be specific. The hair on the front is more whitish, that on the back of the head uniformly greyish yellow, very dense, the posterior orbit of the eyes is snow-white with minute white hairs, flist antennal joint pale yellow, second somewhat lighter than in terminalis; base of proboscis yellow. The hairs on the thorax appear whiter, those on the sides and underside being quite white. The scuttellum, posterior portion of the thorax, and the abdomen are covered with rather short brownish-yellow hairs. Some white hairs at the base of the abdomen at the sides and a few white hairs at the tip, but no snow-white pile at the tip of the abdomen. Legs as in terminalis.

Length, 4 mm.

Described from a unique Q in the Pusa collection from Allahabad, 3. iv. 1906 (Howlett).

## 213. Bombylius terminalis, Brun.

Bombylius terminalis, Brunetti, Rec. Ind Mus. 11, p. 479 (1909)

3. Head with vertex of moderate size, dark grev, eyes contiguous for two-thirds of the distance from the vertex to the antennæ, reddish blown. Antennæ wholly black, 1st joint longer than 2nd; 3rd nearly double the 1st and 2nd together, bearing a short, minute bristle; 1st and 2nd joints with pale hairs. From and face with yellowish hairs, and snow-white pile around the antennæ, lower part of head white, with white hairs;

proboscis black, 3 mm long, back of head with short yellowish hairs above and white hairs below. Thorax thickly clothed with yellowish-grey hairs, scutellum similar, the dark body-colour being visible through the hairs on both thorax and scutellium; sides of thorax with similar hairs, which become whitish on the underside. Abdomen with thick yellowish-grey hairs, which are thinnest on the dorsum and thickest at the sides, becoming whitish towards the tip of the abdomen, the last two segments of which are covered with brilliant snow-white silvery rule and some whitish hairs; venter with yellowish-grey hairs, white towards Leys pale yellow, the femora and tibie showing a slight whitish reflection in certain lights; tips of all the taisi black, the hind tarsi mainly brownish; a few soft hairs below the femora and a row of about six well-separated spines on underside of hind pair, tibiæ with minute spines, which are longest on hind pair. Wings clear, veins towards base yellowish; discal transverse vein placed at one-third of the discal cell, first posterior cell closed half-way between border and origin of fork of fourth longitudinal vein; halteres yellowish white

Length, 5 mm.

Described from a & in the Pusa collection, captured by Mr F W Howlett at Allahabad, 3.1v. 1906, a second & from Labore, in 1908

So far as his brief description goes, my species agrees fairly well with Bigot's albosparsus, but he distinctly says "legs and halteres black," which makes it appear to be a different species.

# 214. Bombylius fulvipes, Big.

Bombylius fulvipes, Bigot, Ann. Soc Ent. France. lxi, p. 362 (1892), Brunetti, Rec. Ind Mus 11, pp. 457, 478 (1909).

2. Head · from at the level of the antenno occupying one-third the width of the head, narrowing at vertex to one-fourth, clothed with short golden-yellow pubescence and some longer brownishyellow hans; underside of face with rather close golden-yellow haus of moderate length, mouth-border bright lemon-yellow, with moderately long yellow hairs. Antennæ black, 1st joint rather long, sub-cylindrical, widening gradually to the tip, with some long yellow hairs on outer side; 2nd joint sub-cylindrical, barely half as long as the 1st, with short black hairs, 3rd joint twice as long as 1st, bare, partly flattened vertically, and "pinched" just before the middle, terminating in a very short whitish blunt Ocelli on a small prominence on the absolute vertex, equidistant; eyes black, bare, facets small, uniform; back of head covered with rather long bright yellow hairs Thorac covered with rather long yellowish-grey hairs, extending entirely over the sides and scutellum; ground-colour of both dorsum and scutellum black. Abdomen densely covered with pale yellowish-grey hairs, which become whitish on the tip; ground-colour blackish; venter with close, pale yellowish-grey hairs. Legs: coxe closely clothed

with yellowish-grey hairs: femora, tibie, and base of tarsi pale tawny; extreme base of femora and apical half of tarsi black; anterior femora with only a very little soft hair below, hind pair with a row of six or seven moderately strong black spines below; all the tibies irregularly beset with short black bristles, which become spinose on the hind pair; and all the tibies have a circlet of very short black spines at the tip. Wings hyaline; upper basal cell only a little, but distinctly longer than the lower one. costal cell and base of wing as far as the origin of the basal cells tawny yellowish; the colour then, gaining an admixture of blackish, extends to three-fourths of the upper and the whole of the lower basal cell, leaving the whole discal cell quite clear; thence extending to the posterior margin of the wing, filling the basal halves of the anal and axillary cells and the whole of the alular, the discal cross-vein is almost imperceptibly suffused. The first posterior cell is closed just before the border.

Length, 5-6 mm.

Described from a perfect single specimen in the Pusa collection, captured by Mr. F. M. Howlett at Allahabad, 19. x. 1905 Other specimens from Belgaum, Bombay, 11. ii 1912 (Fletcher), Lahore, Talewaddi, 3-10. x. 1916, and Castle Rock, 11-26 x. 1916, both N. Kanara Distr. (Kemp).

Though I cannot be absolutely sure of the identity, I think the present specimens are almost certainly Bigot's species.

# 215 Bombylius propinquus, Brun

Bombyhus mopinguis, Brunetti, Rec. Ind. Mus 111, p 220 (1909)

of Q. This species closely resembles terminals, mili, but, intermixed with the yellowish-brown soft hairs on the front part of the head, are numerous long black bristly hairs, there is no snow-white pile around the autennæ, the lower part of the head is brownish yellow (not white), and without white hairs, the base of the proboscis is yellow, and there is no snow-white pile at the tip of the abdomen. The wings have a blackish-brown base-costal band, occupying nearly half the surface of the wing, 1st posterior cell closed at some distance from the border. The proboscis is 4 mm long, the whole insect only 5 mm.

Typs in my collection, taken at Haragama, Ceylon, 1 1908.
Three in the British Museum from Trincomali, 24 in 1891, and
Mahagany, 8. in 1891 and 20. xm 1891, Ceylon (Col Ferbury).

This species is also allied to fulvipes, Big., but the different marking of the wing at once separates them. Described originally from a 3 in my collection from Ceylon. I stated that the all-black antenness eparated it readily from vicinus; but though this is the case in the type, four males from Guindy, Madras, undoubtedly belonging to the same species, show that the antennes are normally more or less pale on at least the underside of the 1st and 2nd joints, and vary from wholly pale to blackish on the

upper side. Two && and 1 Q in the British Museum bear this out.

In the 2 the frons forms one-third the width of the head at the level of the antennæ, slightly but definitely narrower at vertex, yellowish grey, covered (as is also the face) with long silky yellowish scally pubescence, with which on at least the frons are intermixed some black bristles; 1st and 2nd antennal joints on both upper and lower sides brownish yellow.

This species is easily distinguished from both terminalis and vicinus by the dark brown baso-costal band covering approximately half the wing

#### Genus DISCHISTUS, Lw

Disclustus, Loew, Neue Beitr in, p. 45 (1855).

Bombylisoma, Rondani, Dipt. Ital. Prod i, p. 164 (1856), nec. Rond, Arch Zool Modena, in, p. 67 (1863)

Bombylosoma, Marshall, Nomencl Zool p. 323 (1873)

Bombylosoma, Verrall, apud Scudd. Nomencl. Zool. p. 47 (1882)

Genotife, Bombylius minimus, Schrk.; by present designation.

This genus differs from Bombylius solely by the 1st posterior cell being open instead of closed. D. ardens, Walk, has apparently not been recorded since its discovery, and must be regarded as a species requiring corroboration as really Indian. The brilliant scales of D resplendens will easily distinguish it from Walker's species.

Range. Europe, Asia, Africa, South America, and Australia

#### 216. Dischistus resplendens, Brun.

Dischistus resplendens, Brunetti, Rec Ind Mus 11, p. 481 (1909); 1d., op cit. iii, p. 226 (1909)

Head. face below antenno rather prominent, black; antennæ black, very elongated, 1st joint very long, 2nd very short, both with long black hair, 3rd longest of all, flat, with parallel sides and a minute white style at tip; proboscis strong, black, as long as head and thorax together. In the of the eyes are contiguous from just below the vertex nearly to the antenno. tacets very small, those above and towards the front being rather larger; the whole face is clothed with soft long greyish hairs, surrounded by a fringe of stronger long bristly black hairs placed round the inner orbit of the eyes; vertex wholly occupied by the ocellar tubercle and a tuft of long black hairs, the three ocelli being placed in contact with the eyes; underside of head with soft black and grey hairs, back of head with a thick fringe of long soft yellowish-grey hairs and a single row of long black hairs on the extreme ocular orbit. In the 2 the frons is one-third the width of the head, black, with sparse long black hairs and with a number of small brilliant emerald-green and rose-pink scales, intermixed and lying close to the surface; these are also

very numerous on the back of the head, where the dense grey hairs are replaced by a moderately thick fringe of pale vellow hairs, face shining black, bare, mouth-boider pale yellow, bare, underside of head with soft greyish-white hairs. Thoraw and scutellum denuded, but ground-colour black, and dorsum surrounded in front, at the sides, and behind with a dense border of thick grey hairs in the 3, or a much sparser border in the 2; the dorsum shows signs of having been covered lightly with yellowish-grey hairs, attached to the surface of the dorsum of both thorax and scutellum are a number of small brilliant bright green scales, with a lesser number of rose-pink similar scales, both coloured scales extend numerously over the sides of the thorax. In the 3 a quantity of soft black hairs on the sides just below and in front of the wing-insertions. Abdomen similar to the thorax, with similarly coloured scales. In the 3 the shoulders have a bunch of nearly white soft hairs, with a fringe of yellow



Fig. 15 -- Dischistus resplendens, Brun., wing.

hairs between them, the sides with thick nearly white hairs. In the 2 the shoulders have yellow instead of white hairs, and the coloured scales appear more numerous. In both sexes some long black hairs occur over the dorsum, and the venter is black, with grey hairs and a few coloured scales. Legs black, tibus and metatarsi pale brownish yellow, with short spines, hind pair darker; tarsi with rather long black bristles. Wings rather dark grey, brownish on anterior part, venation normal, halteness blackish, tegulæ brownish, with yellowish-grey fringe.

Length, 5-6 mm

Described from one & (type) from Dharampur, Simla IIills, 5000 ft., 6-8. v. 1907, and five Q Q from Sukhwam, Nepal. 15. ii 1908, Nami Tal, 14-17. iv. 1907, and Mergue, Assam; all the specimens being in the Indian Museum. It is common at Dehra Dun in March and April, Theog, Simla IIills, 14 v. 1909; and in the British Museum from Mahagany, Ceylon, 15. ii. 1891 (Col. Yerbary).

# 217 Dischistus ardens, Walk.

Bombylius ardens, Walker, List Dipt. Brit. Mus. ii, p 284 (1849).

"Body black, clothed with long bright tawny hairs; head clothed with brown hairs in front and about the base of the feelers, which, like the mouth, are black; the latter is more than half the length of the body; eyes piceous, legs ferruginous, clothed with black hairs and bristles; thighs darker than the

shanks, feet piceous; wings colourless, dark brown at the base and slightly so along the fore borders; the border of this brown is very oblique, and it slants towards the hinder base of the wing, its outskirts are confined to the sides of the cross-veins, wing-ribs and veins piceous; poisers tawny.

"Length of the body 3 lines, of the wings 7 lines East Indies."

Type in the British Museum.

# Genus SYSTECHUS, Lw

Systachus, Loew, Neue Berti. 111, p. 34 (1855).

GENOTYPE, Hombylius sulphureus, Mikan (Europe); by Coquillett's designation (1910)

This genus differs from Bombylius chiefly by the two basal cells being practically equal in length, owing to the position of the anterior cross-vein near the base of the discal cell. Eyes in sometimes separated by a narrow from. Tip of 3rd antennal joint without the small obvious style present in Bombylius Pubescence of abdomen said to be longer and more ragged than in Bombylius.

Range World-wide



Fig 16 -Systachus, Lw., wing

Life-history. The early stages of S. autumnalis and S. oreas, a European and North American species respectively, have been observed by Portchinsky and by Riley. The larva live in the egg-cases of locusts; they are whitish, cylindrical, amphipmensure, and 13-segmented, much as in Bombylius The pupe also resemble those of that genus.

# Table of Species.

<sup>\*</sup> This is so in many species; I cannot vouch personally for the constancy of the character # 2

The distinctions between these alleged species are not at all clear. I have not seen eupogonatus, which may be the same as socius, the words "legs reddish, femora brownish" being applicable to a specimen with the femora more brown than black; whilst the rest of the description would apply quite well to Walker's species. My nivalis differs from socius only in the nearly white pubescence, and may represent only an individual variation. There may, therefore, be only two species, socius and flavospinosus, with the addition of an undescribed one in bad condition in the British Museum.

## 218 Systechus socius, Walk.

Bombylus socius, Walker, Ins. Saund, Dipt. pt. 3, p. 201 (1852) Systæchus socius, Brunetti, Rec. Ind. Mus. 11, p. 458 (1909)

♂ ♀. Head blackish grey; eyes in ♂ distinctly but narrowly separated at nearest point of approximation, vertex with numerous short stiff hairs; ocelli reddish; from with long black bristly pubescence; face in & with a few long whitish scales, more or less depressed, amidst numerous long dark brown bristles; in 2, with a considerable quantity of long bristle-like whitish scales extending from eye to eye; mouth-opening with dense long blackish-brown scale-like bristles, some whitish pubescence around lower part of mouth-opening, which is itself whitish. lower part of head whitish grey, with dense elongate very thin white scaly pubescence; antennæ black, 1st joint with long dark brown bristles; probo-cis black, as long as the head and thorax (not scutellum) together; back of head with very dense long bustle-like scales, varying from pale to bright yellow, lower eyemargins with whitish scales Thorax black; dorsum, pleure, and scutellum wholly covered with dense elongate scales forming a close thick pubescence, varying from nearly whitish to deep yellow, almost orange, that below the shoulders being generally deeper in shade than that on the thoracic dorsum, scutellium with hind part always more or less reddish brown, sometimes practically entirely so; a row of yellow spines on hind margin. Abdomen black, densely covered with similar bristle-like pubescence to that of the thorax, a row of black spines near hind border of each segment from the 3rd onwards, venter black, with long pale yellow hair-like scales, base of some of the middle segments often reddish brown Legs femora black, with minute whitish scales, tibiæ paler or darker brown, sometimes blackish at tips, especially the hind pair; tarsi black, underside pale brown. Wings pale grey; base, costal cell, and the veins on basal half brownish, halteres cream-yellow.

Length, 7-11 mm

Redescribed from several of each sex in the British and Indian Museums, the Pusa and my own collections.

This species extends from the Himalayas to Ceylon: Kushmir, 1915 (H. T. Pease); Dehra Dun, xi 1907 (Lt.-Col. Wyville

Thomson), iv 1914, common (Chattergee); Theog, Simla Hills, 14. v 1909, Kumaon, 18 & 27 v 1912, Bhowah, 5700 ft, in 1910 (Chattergee); Runjit Valley, Sikkim, v. 1894 (Lt-Col C. T. Bingham) Kangra Valley, 4500 ft, x 1899 (Dudgeon), Coimbatore, 30 v 1912, Hadagalli, Ceylon, v. & xi. 1911.

Type in the British Museum

The colour of the pubescence is so variable that I am inclined to think my nivals may be an extreme form. The proboscis in nivalis is distinctly longer than from the tip of the frons to the tip of the scutellum

Mr T B Fletcher finds that the larvæ prey on the eggs of

the Deccan grasshopper

# 219 Systechus nivalis, Brun.

Systochus nivalis, Brunetti, Rec Ind Mus. vn, p. 472 (1912).

definition of the dark grey, darker above, both thickly covered with long black bristly hairs. Antennæ rather long, black, 1st and 3rd joints subequal, each about three times as long as the 2nd; first two joints cylindrical, 3rd much more slender on apical half. Proboscis very long, labium reaching to middle of abdomen (actually bent backwards to this distance below the body in the type), labrum shorter, palpi extremely short and slender, underside of head dark grey, with whitish hairs. Tho ax and abdomen closely covered with pale yellowish on anterior part of former and whitish on pleuræ and apical part of abdomen, underside of thorax and abdomen with whitish hair. Legs black, tibus from the base, for the major part, brownish yellow. Wings pale grey, costal cell a little darker grey, base of wing a little yellowish.

Length, 9 mm.

Described from a unique of in the Indian Museum from Airadeo, Kumaon Distr., Western Himalayas, 31.v 1912 (Imms) Possibly a variety of socius, Walk.

# 220. Systechus flavospinosus, sp. nov.

Q. This species differs from S socius only as follows:—Face wholly covered with long dense silky yellowish scales, no black bristles; 1st and 2nd antennal joints brownish yellow, 1st with some long pale hairs; 3rd rather shorter and broader basally than in socius; scutellum almost entirely brick-red; spines on hind margins of abdominal segments yellow, not black; femora and tibie wholly bright brownish yellow, tarsi gradually darkening to brown at tips.

Length, 7 mm

One 2 in the British Museum from the South Shan States, Upper Burma, 4000 ft., xi 1899 (Lt.-Col. O. T. Burgham).

#### 221. Systechus eupogonatus, Big

Systachus eurogonatus, Bigot, Ann. Soc Ent France, Ivi, p 305

Antennæ black, 1st joint covered above with long blackish hair, and below grey, face dull vellow, with grey hairs above, hairs on lower part long, black, and thick Frons black, with long black All the body covered with thick pale yellow pubescence. Scutellum black, reddish at tip, halteres tawny, knobs whitish. Legs reddish, femora brownish, with grey tomentum. Wings nearly clear.

"\$\times\$ From grey, with grey pubescence, proboses a little longer than head and thorax together. India" (Bigot)

Length, 10 mm.

Types in the Bigot collection.

### Genus ANASTŒCHUS, O.-S

Anastachus, Osten-Sacken, 'Western Diptera,' p. 251 (1877).

Genotife, Bombylius nitidulus, F. (as barbatus, O.-S.) (Europe). by original designation.

This genus differs from Bombylius by both basal cells being of equal length The dense furry pubescence of the underside of the head distinguishes it from Systochus (which also has the basal cells subequal in length), but not from Bombylius.

Range. Europe, Asia, North Africa, North America, and India.

Only one Oriental species has been recorded.

### 222. Anastochus longirostris, Wulp

Anastwchus longirostris, Wulp, Notes Leyd Mus vii, p. 85 (1885).

- Q. "Small, black; pubescence of head and body white, of frons brown, abdomen with several black bristles, proboscis longer than head and thorax, legs pale yellow, wings groy, base and costa vellowish, 5½ min.
- "Near the American A barbatus, O.-S. The thorax and abdomen more slender, head broader than thorax, with dense long white haus on face and dark brown or blackish on froms. Antennæ black; terminal style of latter as long as the pyriform 3rd joint, end of style a little thickened Proboscis black, as long as two-thirds of body Thorax and abdomen thickly clothed with long yellowish hairs, with a white reflection, amidst which are some long black bristles on the sides of the abdomen. Legs Wings greyish, yellowish at base and halteres pale rufous and costs, at the beginning of the costs is a comb of black-tipped vellowish hairs. Venation as in A. barbatus. One 2 from the Himalayas (Felder)." (van der Wulp.)

This species is unknown to me.

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### Genus GERON, My.

Geron, Meigen, Syst. Besch ii, p 228 (1820).

Genotype, Bombylous hybridus, Mg (Europe), by original designation.

Head semicicular, narrower than thorax and set low down on it; epistome short, mouth-opening large, proboscis prominent, horny, curved, with narrow labella, eyes in o contiguous, widely separated in Q. Anteniae poriect, approximate at base, longer than head, 1st joint long, cylindrical, 2nd very short, 3rd as long as 1st, spindle-shaped. Thorax oval, considerably arched, projecting forward; thinly pilose or with microscopic tomentum, scutellum triangular. Abdomen extremely short, conical, tip pointed, thinly pilose. Legs slender, minutely pubescent. Wings with 3rd longitudinal vein forked, anterior cross-vein beyond middle of discal cell, erect, two submarginal cells, three posterior cells; anal cell nearly reaching border of wing, anal vein attaining the border.

Range World-wide
Life-history unknown.

The two Indian species are thus distinguished.—
Legs hale brown, tibin paler, length 2½-4 mm
Legs hale tawny, coxe, tips of femora, and hind tais black, length 5 mm
... albescens, Brun.

### 223. Geron argentifrons, Biun

Ger on as gentifions, Brunetti, Rec Ind. Mus. 11, p 482 (1909)

3. Head with eyes contiguous from the very reduced inised vertex to antenno, facets of moderate and uniform size, vertex with several long black hairs of variable lengths; ocelli well separated, pale brown, from covered with dull yellowish oblong scales, lying flat on surface, and with a second clothing of silverywhite scales; tace bluish white, with silvery reflections seen from above, as are also the lower eye-orbits; some long black hairs on face; upper side of month-opening yellowish, occiput black, with long brownish-grey hairs. Antennæ black, tip of 1st and 2nd joints sometimes very narrowly whitish, 1st joint about double as long as 2nd, 3rd distinctly longer than first two together; Thoraw black, with long brownishbasal joints occasionally pale grey or yellowish-grey pubescence, through which can be seen a lower clothing of very short yellow scale-like hairs; pleuræ bluish grey, with whitish-grey pubescence Abdomen dorsally like thorax, sides with numerous silvery-white scale-like hairs; apparently the whole dorsum normally covered with long hairs, which may be thicker and longer at the sides, venter like dorsum, except that the long hairs are a little shorter. Legs normally dark brown or blackish; tibus always paler, varying in shade from yellowish to moderately dark reddish brown; femora apparently

(and probably coxe also) covered with small silvery-white scales: tibes with small yellowish scales, short black spines and a circlet of them at tips, which are a little darker, tarsi black, with usual pubescence, metatarsi partly or almost wholly pale Wings quito clear, iridescent, veins pale yellow, squame pale yellow, with short hairs; halteres large and prominent, clubs egg-shaped, from nearly white to bright yellow.

Q Frons at vertex forming one-fourth the width of the head, covered with bluish-grey dust and with very small yellow or yellowish-white scales; a cluster of silvery-white scales around base of antennæ, face as in 3, except that the long hairs are white, not black. Underside of first two antennal joints pale. Posterior femora and apical part of fore pair, also all the tibiæ, pale yellowish.

Length,  $2\frac{1}{2}-4$  mm.

Redescribed from type of from Lahore, 9 v. 1908 (Annandale), and three other of of, also three 9 9, all (except type of) from Pusa, Bengal (Howlett, etc.), where it is common, March to May. Also from Almora, Kumaon Distr., 5500 ft., v-vi. 1911 (Pava), Parel, Bombay Presid., 26. xi 1909. In the British Museum from four places in Ceylon, Trincomali, x. 1890, and Nilavelli, 31. viii 1890 (Col. Yerbury), Pundaluoya, ii 1898 (Green), Madulsima, 19 v. 1908 (T. B. Fletcher).

This species is parasitic on caterpillars found under the bark of the sissoo-tree (*Dalbergia sissoo*); it also occurs on the pipal.

Types in the Indian Museum

#### 224. Geron albescens, Brun.

Geron albescens, Brunetti, Rec. Ind. Mus. iii, p. 229 (1909)

d. Head black, eyes contiguous almost to antenno, frontal triangle extremely small, upper facets slightly larger than lower ones, vertex elevated, small, with a few short black hairs, ocelli

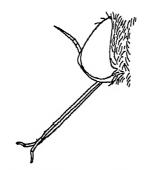


Fig. 17 -Geron alhescens, Brun, lateral view of head.

red; mouth black, grey bordered; face small, squarish, black, with some snowy-white scales on each side of base of antennæ;

proboscis black, antennæ black, relative length of joints as in argentifrons, tips of first two joints nairowly pale, with greyish hairs, occiput black, with long yellow hairs above and greyish ones below; hind margin of eyes with small white scales. Thorax velvet-black, dorsum covered with bright yellowish hairs, which are greyish on the grey shoulders; underside ash-grey, with long grey hairs and some grey scales; scutellum black, yellow-haired Abdomen black, with minute bright yellow fine scales and hairs, hind margins of segments with long deflexed grey hairs, whole dorsum with long thin greyish pubescence, which is denser at the sides; venter wholly covered with small silvery-white scales and long grey hairs. Legs with coxe and fore femora black, former with grey hairs; posterior femora and all tibie pale tawny, taisi black, middle metataisi more or less pale at base; legs almost



Fig 18 - Geron albescens, Biun, wing

bare except for a few short hairs below femora and the usual minute tibul bristles. Wings quite clear, veins pale yellowish on basal half, halteres yellowish, knobs bright pale yellow.

Length, 5-8 mm.

Redescribed from the original type from Balugaon, Puri Distr, Orissa, 14 xii. 1908 (Caunter), and a second of from Tambi, Satara Distr., Bombay, 2100 ft, 22-26. iv. 1912 (Gravely), both in the Indian Museum.

E. The only definite character by which this species differs from argentifrons seems to be the pale posterior femora in the 3 and the larger size.

### Genus USIA, Latr.

Usia, Latreille, Hist Nat Ciust Ins xiv, p 300 (1804). Volucella, Fabricius (nec Geoff), Ent Syst. iv, p. 412 (1794), id, Syst. Antl. p. 114 (1805), Meigen, Klass i, p. 194 (1804)

(FENORYPE, Volucella florea, F (Europe); by Rondani's designation.

Rather small bare or nearly bare files, sometimes of metallic ground-colour, sometimes with yellow and black markings. Head hemispherical, small, set rather low on the thorax, epistonic short, proboscis prominent, at the base membranous, apical part horny with extremely narrow labella; palpi short, united to the basal part of the membranous portion, which is entirely withdrawable within the mouth-border. Antennæ short, porrect, hardly longer than head, approximate at base; the first two joints subequal; 3rd elongate, spindle-shaped above, blunt, with spines

and a short apical style Eyes in both sexes normally distant, but sometimes contiguous in 3. Thorax oval or nearly rounded, arched, scutellum short and broad. Abdomen of seven segments, short oval, broader than thorax. Legs rather stout, bare, without spicules. Wings in rest, half open, venation as in Geron.

Range. Europe, Asia, North Africa Life-history unknown.

The two Indian species are distinguished as follows:-

*sedophila*, Brun

margnata, Brun

#### 225 Usia sedophila, Brun

stripes

Usia sedophila, Brunetti, Rec Ind. Mus. 111, p 227 (1909)

d Head: vertex prominent, black, shining, with a few erect long hairs, occili distinct, whitish, eyes black, bare, contiguous for more than half the distance from vertex to autennie, facets in front and above distinctly larger than those behind and below, but no distinct dividing line. Antenne black, bare, except for an occasional hair; first two joints short, 3rd somewhat flattened, but thick and slightly curved, elongate, and with a peculiar notch towards the tip on upper side, in which is a single hair. Proboscis about twice the length of the head, black, cylindrical, stiff, straight, bent upwards at tip, bare, except for a few minute hairs at tip, face dark greyish, with some stiff black hairs on each cheek, and



Fig 10 - Usia sedophila, Brun, wing

a long elevated shining black callus between the median line and the eye-maigins, back of head black, not produced behind marging of eyes, with long sparse black hairs, continued on underside of head. Thorax dull black, velvety on dorsum, with some black and pale hairs towards the sides, and three whitish-grey elongate spots on anterior border, of which the middle one is often absent, and the outer ones are occasionally indistinct or absent also; lower part of thorax more or less dark grey, scutellum black, with some erect light tawny hairs. Abdomen dull black, conical; 1st segment narrow, wholly black; the remaining six broader, but of diminishing length and breadth to the tip, and with a rather bright yellow narrow posterior border to each segment; dorsum

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comparatively bare, but the sides of the abdomen with pale yellow hairs. Genitalia small, inconspicuous, conical, blackish. Venter blackish, posterior margins of segments whitish grey Legs uniformly black, very shortly pubescent; temora with some soft hairs; hind tibus with short bristles. Wings nearly clear, subcostal cell pale yellow, venation normal; halteres dark brown or

blackish, knobs large

A Head eyes separated by a wide from equalling one-third width of head, upper half of frons, as also whole back of head, greyish yellow, the latter with black hairs as in d, upper half of trons with a row of hairs near margin of eyes, vertical triangle distinct, dark, two narrow fuscous vertical lines from the vertical triangle to an irregular transverse dark streak dividing the upper from the lower half of the frons, the latter part being more ashgrey and unmarked; lower part of the head greyish, proboscis and mouth larger than in &, thus narrowing the cheeks considerably. Thorax yellowish grey, with a median pair of narrow fuscous lines, with a broader outer stripe, more or less divided into three spots, the anterior one small and conical, the other two more elongate; also an indistinct central line between the median pair of narrow ones, and a small spot above the insertion of the wings, sides of thorax emercous grey; scutellum yellowish grey, with some yellow hairs as in J Abdomen black, bare, posterior margin of segments rather broadly yellow, sides with a little less hair than in d, venter blackish, ovipositor pale yellow, inconspicuous Legs and wings as in d.

Length,  $2\frac{1}{4}$ - $3\frac{1}{2}$  mm

Described from several of both sexes taken by Dr Annandale at Simla, 16. v 1909, where it was common on Sedium rosulation (white stonecrop); the species was not seen anywhere except on this plant Phagu, 18-21. v 1916 (Annandale)

Types in the Indian Museum

# 226. Usia marginata, Brun

Usia maryinata, Brunetti, Rec Ind. Mus 111, p 228 (1909)

3. Head with eyes contiguous for a shorter space than in sedophila, black, bare, upper facets larger than lower, and more sharply defined from one another than in sedophila, from ashgrey, small, with a few black hairs, vertex prominent, with some black hairs, ocelli distinct, front margins of eyes and cheeks with long black hair, which is considerably thicker on the underside, and which extends over the whole of the back of the head. Antenna as in sedophila, but the third joint with a pale ring at the base, giving the appearance of a minute basal joint, and the tip bears on its upper side a minute style-like process, just beyond the subapical depression, 1st joint with some bristly black hairs, 2nd with one or two minute hairs, 3rd bare. Thorax dull black, almost velvety, covered lightly on dorsum, and more thickly

in front and at sides with long black hairs, anterior margin of thorax broadly whitish grey, which in the centre is produced posteriorly into four narrow stripes, of which the outer pair just reach the suture, the inner pair being very slightly shorter, sides of thorax black, with long black hairs, and the whitish-grey colour of the anterior margin of dorsum extends downwards somewhat below the shoulders. Abdomen dull black, posterior margins of segments narrowly yellowish, with the colour continued over the sides and across the venter; a row of grey hairs on posterior border of segments, and the sides of the abdomen with rather thick whitish-grey hairs, venter concolorous. Leas black, minutely pubescent, femora with rather long soft black hairs on upper and lower sides; hind tibus very shortly bristly. Wings nearly clear, subcostal cell very pale yellow, halteres pale brown, clubs chalk-white.

Length, 4 mm.

Described from one of taken by Dr Annandale at Simla, 16. v. 1909, in company with the previous species. A second specimen with the same data, both in the Indian Museum

### Genus PHTHIRIA, Mg

Phthuu, Meigen, Illig Mag. 11, p 268 (1803)

Megapalpus, Macquart, Hist Nat Ins., Dipt. 1, p 394 (1834)

Dasypalpus, Macquart, Dipt. Evot. 11, pt 1, p 112 (1840)

Cyclorhynchus, Macquart, Dipt. Evot. 11, pt 1, p 114 (1840) preocc

Phtyria, Rondam, Arch. Zool. Modena, 111, p. 05 (1863)

Pæcilognathus, Jaennicke, Abh. Senck. Nat. Ges. vi, p. 350 (1863)

GENOTYPE, Bombylius pulicarius, Mikan (Europe), by original designation

Head in d nearly semicircular, in Q nearly circular, not broader than high viewed from in front, about as wide as thorax, face broad but short down the middle, because the large and rather wide mouth-opening extends up between the wide side cheeks, from in Q broad, depressed in the middle, three ocelli, eyes in & contiguous or subcontiguous, in Q wide apart. Proboscis long, thin, almost bristle-like, directed forwards in a slight auch, labella very small; palpi rather short and thin Antonno porrect, shorter than head, approximate at base; 1st and 2nd joints short, subequal in length; 3rd elongate, peg-shaped, with a terminal style (sometimes indistinct). Thorax oval, longer than broad, slightly arched, in & with fairly long erect dense pubescence, without bristles, in & with only short depressed pubesconce. pleure with only slight pubescence, except for a rather dense tuft on the mesopleure; metapleure bare; scutellum large, semicircular. Abdomen 7-segmented, contral in &, ovate and rather flattened in Q, pubescence as on the thorax in Q. Legs long and thin, entirely without bristles except for some tiny spicules on the hind tibiæ. Wings longer than abdomen; 1st basal cell PHTHURIA. 285

considerably longer than 2nd, 3rd vein forked, the 2nd submarginal cell elengate; anterior cross-vein at about middle of discal cell, anal cell closed just before wing-border.

Range World-wide.

Life-history unknown

The adults occur on bare patches of ground among low-growing flowers, and on Composite.

#### 227. Phthiria gracilis, Walk.

Phthina gracilis, Walker, Ins. Saund, Dipt. pt. 3, p. 194 (1852)

of Q. Head in of black; vertex very small, dark grey, with three or four short black hairs, occili dark ruby-red, shining; eyes closely contiguous for nearly all the distance to the small protruding triangular dark grey froms, which bears a few black hairs, mouth-opening extremely large, extending from immediately below base of antennæ to lower part of head, black, tace and under part of head black, both with long black hairs; antennæ black, 1st and 2nd joints as long as wide, subglobular, with two or three short black hairs each, 3rd joint narrower, flattened, about two and a halt times as long as first two together, with microscopic depressed pubescence and a short style-like prolongation at tip on upper side, proboscis as long as whole body, black, slender, gently curved; palpi half as long as head, porrect, black. Head in Q bright orange-yellow, from at vertex about half as

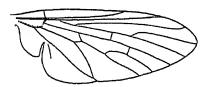


Fig 20.—Phthiria gracilis, Walk, wing

wide as at level of antennæ, where it forms nearly one-third the width of the head, a broad black stripe from vertex to above antennæ, sometimes wholly interrupted in middle; occili distinct; sides of face between antennæ and eyes blackish; occiput black, broadly orange behind eye-margins, the colour not extending behind the vertex. Thorax in & dark blackish blown, with a little short dark brown pubescence, which is longer towards the sides of the dorsum, scutellum concolorous. In Q greenish grey, lower margin of dorsum rather broadly though somewhat irregularly pale yellowish, scutellum yellow, with a small blackish spot at base. Abdomen in & black, with long black hairs, hind margins of basal segments more or less narrowly yellow. In Q yellowish, with short, brown, not very obvious pubescence; base of segments

more or less broadly blackish, the colour confined to the middle of the disc on the basal ones, but extending to nearly or quite the full width in the others. Venter and genitalia in both sexes black, with some soft hairs Legs in 3 all black, in 2 yellowish; hind pair and anterior tais blackish, all legs devoid of pubescence, except for a few short hairs below tip of posterior femora. Wings brownish in 3, very pale giey in 2, almost clear, subcostal cell yellowish for some distance from tip, halteres yellowish, knobs blackish; thoracic squame very large, yellowish, with a fringe of pale hairs

Length, 4-5 mm

Redescribed from one  $\sigma$  and three Q Q from Simila, x 1908 (F M Howlett).

Type in the British Museum

### Subfamily TOXOPHORINÆ.

Head moderately transverse, rounded behind eyes, as wide as or a little wider than thorax, generally considerably depressed Eyes in of contiguous or subcontiguous, the front facets sometimes enlarged, no indentation in middle of hind margin; in 9 widely separated Face usually produced over the long narrow mouth-opening; probosers generally long, slender, or short and thick in some (non-Oriental) genera (Cyllenia), palpi long and thin in Tocophoia, short in some genera Antenna closely approximate at base, porrect, as long as or longer than head. Vertex with a pair of strong bristles in Toxophora Thorax very humped, with scaly pubescence in some genera and strong side bristles in Toxophora. scutellum rather large and with strong marginal bristles in Toxophora. Abdomen tubular and elongate, much curved downwards, so that the whole body seen in profile forms nearly half a Legs with strong bristles behind hind femora in most genera, but on apical half only in Toxonhora; there are some exceptions. Tibiæ generally with conspicuous bristles or spicules on hind pair. Wings with the 2nd longitudinal vein looped or not near its end; two or three submarginal and three or four posterior cells, anal cell closed at some distance from the border in Toxophora, open in some genera. Alula and hind angle of wing well developed in Toxophora, weak or absent in some genera; squame generally with only a slight fringe, but Toxophora has a long rigid one.

The puncipal characters of this subfamily are the structure of the antennæ, the usually humped thorax, the long narrow abdomen, and three posterior cells The limits of the group are not well defined, and the species all appear to be uncommon.

#### Genus TOXOPHORA, Mg

Torophora, Meigen, Illig Mag 11 p 270 (1803).

Genorype, Asilus maculatus, Rossi (Europe), by Meigen's designation (Klass 1804, p. 273)

Head semiglobular, as broad as thorax, placed low on it; epistoma short, proboscis poirect, horny, with narrow labella, palpi long, filiform, thicker at base. Antenne very long, prominent, horizontal, approximate at the base, 1st joint cylindrical, as long as 2nd and 3rd together, 2nd cylindrical, about half as long as 1st; 3rd shorter than 2nd, awl-shaped Eves in d contiguous, in Q wide apart, three ocelli Thorax oval, extremely arched, hump-backed, scutellum broad and short Abdomen a little narrower than thorax, 7-segmented, elongate, conical, aiched downwards, pointed at tip, generally with yellow or whitish transverse bands. Legs rather stout, moderately long, tibice strongly bristly, tarsi with two pulvilli. Wings with 3rd vein torked abruptly, three submarginal cells, three posterior cells, 1st basal cell much longer than 2nd; anterior cross-vein at or just beyond middle of discal cell, anal cell closed just before border, alula rather small

Range South Europe, Asia, Africa, North and South America. Life-history unknown

These are moderately large, slightly pubescent, rather bristly flies of a peculiar hump-backed appearance, closely covered with scales on many parts of the body.

# 228. Toxophora javana, Wied (Pl III, fig 16)

Taropho a javana, Wiedemann, Dipt. Exot. p. 179 (1821); id., Auss. Zweifl. i, p. 363 (1828), de Meijere, Tijd. v. Ent. lin., p. 66 (1910), Brunetti, Rec. Ind. Mus. ii, p. 458, pl. xii, fig. 28 (1909).

d Q. Head in d with eyes contiguous nearly to antenna. leaving a small protruding from concealed by the bunch of long thin bright yellow scales surrounding base of antenna, vertex very small, black, with a pair of strong ocellar bristles, tace blackish, with a white shimmer seen from above, mouth-orbit whitish, proboses about 13 times length of head; antennæ over twice length of head, 1st joint about as long as 2nd and 3id together, black, covered with very small brown scales lying close on the surface, and, at least on 1st joint, with more elongate and less depressed silvery scales, on 2nd joint a number of elongate dark brown scales, on 3rd a considerable amount of dark brown hairs; occiput black, whole middle part with deuse elongate conspicuous bright chrome-yellow scales, which extend laterally to the eye-margins, and sometimes are continued upwards behind the eye; below these scales is a clothing of very small oblong pale brown scales resting flat on the surface, apparently entirely covering it; on lower part of occiput a large bunch of very elongate bristle-like yellow or whitish-grey scales. In 2, frons at vertex about one-fifth of the greatest width of the head, broadening distinctly to base of antennæ Thorax black, with a coating of very small oblong brownish scales lying flat on the surface, and a further clothing of dense short bright chrome-yellow hair-like scales covering (presumably) the entire thoracic and scutellar dorsum, this vestiture being a little shorter and longer towards the sides; pleure covered (apparently entirely) with similar scales of greyish-white colour Abdomen black, with a layer of small brownish scales as on the thorax, and a clothing of closely-placed, moderately elongate, yellow overlapping scales, evidently covering the entire dorsum and sides in perfect specimeus; sides of 2nd segment with four or five long, slightly curved, yellow bristles. Venter bearing at least a broad median stripe of similar scales, which are greyish white; hind margins and sides of all the segments with small bright yellow scales, whole venter sometimes covered with small whitish scales, more densely so on hind margins of segments Legs black; coxe with white scales on front sides, hind pair with three long yellow bristles on outer sides; femora and tibiæ closely covered with small brown scales as on the body; anterior femora on hinder and undersides, hind femora on outer and undersides, with small overlapping silverywhite scales, hind pair with a few small black bristles below: tibiæ with several rows of strong bristles, outer sides with small depressed whitish scales, their extent apparently variable, all tibiæ on inner side with a row of rather longer, dark brown, somewhat outstanding scales, and with a circlet of apical spines; tarsi black, with short black bristles below. Under moderate microscopic power the whole surface of the tarsi is seen to be covered with extremely minute black scales. Wings grey, more or less brownish on anterior part, sometimes distinctly so as far hindwards as the 4th longitudinal vein, sometimes the colouring much restricted or almost entirely absent, leaving only the transverse veins slightly suffused; halteres pale brownish yellow, thoracic squamæ whitish, with a long fringe of white hairs.

Length, 5-6 mm. (excl. antennæ).

Redescribed from one of in the Pasa collection (Allahabad, Howlett) and one of and three \$\mathbb{Q}\$ in the Indian Museum, Calcutta, 7. v. 1907 (Caunter), 7. vii. 1907, Allahabad, 21 ii. 1906 (Howlett); Gaindy, Madras (Capt Crayg). De Meijere records it from Krakatua, Java.

Type in Westermann's collection.

The colour of the body-scales in this species is sometimes uniformly bright yellow and sometimes wholly snow-white; in some specimens scales of both colours are present in variable proportions, those on the thorax and forming a broad median stripe on the abdomen being yellow, whilst those on the pleurso and sides of the abdomen are white. Probably in perfect specimens the whole thorax and abdomen are covered with scales; but when a specimen is partly denuded, the form usually taken is of a median and lateral stripes of scales and more or less complete transverse bands of them on the hind margins of the segments.

### Subfamily SYSTROPINÆ.

Head distinctly transverse, occiput excavated, bare, three ocelli on small but distinct tubercle; neck short; eyes in both sexes contiguous, bare (with rare exceptions), no indentation at middle of hind margin, front facets in o rather larger than in Q. Frontal triangle small, bare, face narrow, one-sixth width of the head at its upper and lower part, and narrowing to one-eighth of Mouth-opening long and narrow, the head in its middle, bare extending nearly to the autennæ; proboscis long, slender, porrect, from as long as, to twice the length of the head; palpi small Antenno very elongate, thin, porrect, as long as head and thorax together, closely approximate at base and barely diverging till the end of the very long 1st joint, which forms half the full length of the antennæ; 2nd joint one-third of 1st, 3rd wider, cigar-Thorax much arched, especially shaped, with no style or arista in front, nearly bare, no bustles, a large prealar depression on each side: sides of thorax bare or with slight tomentum; scutellum rather small, sloping, metanotum concealed, except a peculiar pale-coloured membranous tubercle on each side. Abdomen very long and thin, cylindrical, 9-segmented in d, 8 in Q, bare. Genitalia in 3 rather knob-like, in 2 sharply compressed. Legs comparatively short and thin; hind pair much longer and rather thicker; legs generally bare, except for three rows of spicules and a tew short spurs on hind tibix, and some "plantar" spines on In some species there is a spine below the middle Wings with anterior cross-vein beyond of the hind femora. middle of discal cell, two, iarely three, submarginal cells; three posterior cells, always open; 3rd longitudinal vein widely forked; anal cell closed, alule absent, base of wing cuneiform; tegulæ absent or minute, halteres long and conspicuous

The affinities of this subfamily are not definite, there being no close relationship to any of the others. Only two genera and about forty species are known. The extremely long attenuated abdomen and long thin hind legs, three posterior cells, elongate

antennæ, and bare body characterise them.

### Genus SYSTROPUS, Wied.

Systropus, Wiedemann, Nova Dipt. Gen. p. 18 (1820), Loew, Fauna Sudair. p. 200 (1860)
Cephenes and Systrophopus, Latreille, Fam. Natur p. 496 (1825).
Cephenus and Systrophopus, Karsch, Zeits. f d. ges. Naturw. Ini, p. 056 (1880).
Xystropus, Verall, apud Scudd. Nomenol. Zool. p. 355 (1882).

GENOTYPE, Systropus nucolentus, Wied. (S. Africa); by original designation.

Body extremely attenuated, with long narrow wings and comparatively short anterior legs, hind legs very long; practically

Head as broad as or broader than thorax, eves bare species reaching from top to bottom of the head, closely contiguous in both sexes; facets very small, of uniform size, vertex reduced almost to a point, three ocelli; from and face forming an isoscoles triangle, slightly prominent at base of antenna, entirely bare, antennæ very long, 1st jouit very long, cylindrical, 2nd less than half as long, cylindrical, 3rd joint flattened, style absent, probosers very long and thin, porrect, the bifid tip cuiled backwards, palpi thin, short, concealed within or but slightly projecting from mouth-opening. Thorax a little longer than broad, with rounded corners, dorsum slightly arched, lower part of metathorax enormously developed, the hind coxe set at its lowest point. scutellum broad, very short. Abdomen, except the triangular basal part of 1st segment, very attenuated, about one-fourth as wide as and three or four times as long as thorax, 8-segmented, tip more or less clubbed, genitalia small. Anterior legs comparatively short and thin, hind legs long and thin, stretching considerably beyond tip of abdomen, the femora, tibie, and tarsi of about equal length; metatarsus as long as rest of tarsus. pulvilli small; legs bare, except for some moderate-sized bristles on hind tibiæ. Wings long and narrow, cuneiform at base, alulæ entirely absent; auxiliary and 1st longitudinal veins very long, closely approximated, præfurca very short, 3rd vein widely forked near tip of wing; two, rarely three, submarginal cells, and only three posterior cells; discal cell present, anterior cross-vein just beyond its middle, anal cell closed at some distance from margin of wing; analyein long, straight, reaching wing-margin

Range Africa, Asia, North and South America

Life-Instory Westwood (Trans. Ent Soc. 1876, p. 571) describes the cocoons of a moth and the pupa of an African species of Systropus (S crudelis, Westw.), found on a accacia-tree in Natal The cocoon is oval, slightly flattened on the side attached to the tree, seven lines long, the outer surface smooth, and at one end is a circular piece which is easily removed, allowing the perfect insect to escape The cocoons were probably of an "Egger" moth, and inside each was a well-formed Systromus pupa possessing a strong frontal projection (apparently for the purpose of forcing off the hid of the cocoon) The head bears a long appendage below (probably the antenna and proboscia). The abdomen is robust, convex, bearing a transverse row of spines on each segment, which doubtless also assists its escape from the cocoon. In one of the specimens the imago was seen in the act of escaping from its pupa skin, and Westwood notes that the mouth-parts during emergence consisted of four delicate These doubtless united subsequently to form lancet-like pieces the proboscis Westwood (Plate x) gives several figures of the pupa and perfect insect.

<sup>\* [</sup>More probably a Limacodid of the genus Parasa — ED.]

#### Table of Species

Hypopleura black, with distinct grey pubescence

From distinctly wider below than above, a yellowish spot on posterior calli. . From with nearly parallel sides, no pale

spot on posterior calli

Hypopleuia practically bare, yellow on anterior half, black posteriorly

Thorax mainly yellow, with a heart-shaped median black spot with short anterior stripe, two spots toward humeri, and a cuneate one at base of wing, occiput yellow, hind tibre yellow, a brown stripe on outer side and subapical blackish ring, halteres yellow

Thorax mainly black, with yellow marks, occiput black, a little grey-dusted, hind tibine black, base narrowly brownish yellow, inps broadly yellow, halteres with club black, narrowly yellow-bordered...

[p 29]. ophioneus, Westw,

edwardst, spn, p 294

eumenoudes, Walk,

favipleura, sp. n.

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#### 229. Systropus ophioneus, Westw

Systropus ophioneus, Westwood, Trans. Ent. Soc. v, p. 233, pl. xxiii, fig. 6 (1849), 1d., op. cit. p. 574 (1876) Systropus magnicandus, Brunetti, Rec. Ind. Mus. 11, p. 483 (1909).

3 2. Head with vertex reduced almost to a point; eyes black, bare, contiguous for rather more than half the distance from the

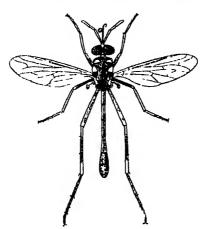


Fig 21.-Systropus ophioneus, Westw.

vertex to the antennæ, gradually diverging until at the mouthborder they occupy nearly one-third the width of the head, facets small, of uniform size; the frons and face combined appear as an isosceles triangle, the inner portion being very deeply retracted, leaving a broad white maigin on the three sides, above this the antennæ are placed on a slight yellowish-white (almost quite white) prominence, and from the cavity below protrudes the long black probosers, 3½ mm. long, which is brown at the base Antenna with first joint white at the extreme base, becoming immediately pale yellow, graduating into orange, which forms the centre part, and deepening into black for about the apical third, the whole joint with scattered short black spines, second joint half the length of the first, wholly black, closely covered with black spines, third joint all black, quite bare, slightly shorter than the first. Back of head silvery white, with some short white hairs Thorax black, finely punctate, with very sparsely scattered, very short, golden-yellow hairs. two rather narrow central grey stripes run close together from the anterior margin to the middle, where they coalesce and continue united to the posterior margin; these stripes are only visible when viewed from behind On the shoulders are placed three calli, the upper and largest one being almost bisected, the intermediate one very small and triangular, the lower one as large as the upper and also triangular; the upper one is contiguous to a more or less oblong spot on the dorsum, directed inwards and backwards, the remaining call are placed vertically beneath the upper one. all being contiguous to one another, the lower ones touching the concolorous fore coxe, all these spots are pale yellowish white A scale-like callus is placed in front of the wing, and is yellowish white on the anterior half, and black on the remainder, which reaches back to the posterior callus which is yellowish white. Below this callus is a small round yellowish-white scale, by the side of the scutellum and below the wing is an orange-vellow scale-like process, connected by a thin membrane to the just-The sides of the thorax are black, with a mentioned scale. few blackish-brown hans and some whitish-grey hairs in front of the insertion of the wings and a larger quantity of longer similar hairs on the large sternopleura Scutellum black, finely punctate, posterior half with some grey hairs Abdomen at base wider than the scutellum, rapidly contracting posteriorly, forming a triangle: black, finely punctate on dorsum, with some very short grey hairs; at the sides are much longer hairs, both black and grey; second to fifth segments (inclusive) very narrow, dorsum black. sides and venter orange-yellow, fifth slightly widening at tip; sixth, seventh, and eighth segments widened into an elongated club, but the segments themselves are all shorter than the others, the eighth being shortest of all; sixth segment orange, seventh and eighth reddish brown The whole abdomen at sides with very short, scattered, golden-yellow hairs; on dorsum with microscopic black hairs, and the last three segments with very short black hairs, which are also present on the posterior borders The anal appendage (3) withdrawn within the of these latter.

SISTROPUS. 293

much segment (which latter is peculiar to the d only, in accordance with Osten-Sacken's views in the Biol. Cent -Amer, Dipt. 1, p. 157), consists of an orange process bearing an upper pair of jet-black comeal claspers, there being also an orange-coloured plate projected from the eighth segment, bearing a very small pair of black conical claspers at the tip. Legs. Coxe: fore pan wholly pale yellowish white, bare, middle pair yellowish white, with a large black mark on the outer side, on the basal half, and bearing a few dark hans, hind pair black, with a little pale colour on inner Femora. fore pair pale yellowish white, with a dark brown streak behind, about the middle; middle pair black, extreme base and tip pale yellowish white, hind pair with basal half pale yellow, deepening to orange on the apical half, extreme base black above Tibim: fore pair pale yellowish white, baie, middle pair similar, but with a few very black spines at the tip; hind pair yellowish orange, streaked here and there with black above, with irregularly-placed black spines, and with a circlet of some short black spines at the tip. Taisi anterior ones pale yellow, upper side blackish on apical half, hind pair black, minutely pubescent, slightly yellowish at extreme base, and with a row of minute black spines below. Wings light brownish grey. unmarked; halteres lemon-yellow

Length, 17-23 mm.

I described this species as ingricandus from a  $\sigma$  and  $\Omega$  in the Indian Museum from Soondrijal, Nepal, and Museome respectively, and a second  $\Omega$  in the Pusa collection also from Museome. Further specimens from Kalimpong, Darpling Distr., 600-4500 ft,  $\Omega$  iv -10 v 1915 (Gravely), Peshoke Spur, Darpling Distr. (Lister), Museome, in 1906, Shillong, 4900 ft., 27. vi 1918.

After the careful examination of several specimens there seems no doubt that my nuprocuidus is identical with ophioneus, which appears to show considerable variation in the extent of yellow in the autenno, the size and extent of the thoracic spots and their frequent union by short connecting-bands, and in the presence or absence of the streak on the middle tibio, besides minor differences.

In the type of nyrwandus (Nepal) the 1st antennal joint and basal half of 2nd is yellow; the thoracic spots, three on each side of the dorsum, quite separate, the humeral one reaching down to the front coxe, the scutellum is wholly black; the 1st abdominal segment also all black; the four anterior femora have more than the basal half black; the fascia on the middle tibis is not obvious, but the inner side from base to tip bears minute black bristles in another specimen (Daryling) the first two antennal joints are yellow; the spots on the humeral, prealar, and posterior calli are joined by a distinct yellow band, the anterior spot extending broadly to the fore coxe, the scutellum is all black, except for a distinct yellow hind margin; the first abdominal segment all black; the fascia on the middle tibus absent. In a third specimen (Kalimpong, Daryling District) the antennes are black, except the

major portion from the base of the 1st joint, the two anterior pairs of thoracic spots are broadly joined, the humeral pair extending downwards to the front coxe; the cuiente hinder spots are isolated, the scutellum black, but the underside of the hind margin is yellow, nearly the whole of the club of the halteres is black, leaving a narrow yellow margin, the inner side of the middle tibie is distinctly brownish, with tiny black bristles

#### 230. Systropus edwards, sp nov.

3. Near, but quite distinct from, ophioneus. Antennæ black, except 1st joint which is brownish basally, face with nearly parallel sides. Dorsal spots on thorax as follows.—A humeral nearly square one, with a piece cut out of the front side, this spot connected by two small ones with the yellow propleura as in ophioneus, also extended along dorsal margin, narrowing to a point, turning upwards and nearly reaching wing-base, all these spots bright yellow, no spot on posterior corners of dorsum, but the margin in that neighbourhood showing yellowish traces, a little yellowish about wing-base and contiguous to 1st abdominal segment, but the pleura practically all black. Sides of abdomen orange or brownish yellow to the tip, including last segment and gentalia. Anterior legs pale yellow, showing darker traces on upper side of femora

In all else as in ophroneus.

Length, 22 mm.

Described from a unique of in the British Museum from Taung-ngu, Burma, xi. 1889 (Lt.-Col. C. T. Bingham)

### 231. Systropus eumenoides, Westw

Systiopus eumenoides, Westwood, in Guérin's Mag. Zool. p. 4, pl. 90 (1842), id, Trans Ent. Soc, pl. x, figs 13, 14, 15 (1876).

"Antennæ yellow, 1st joint at tip, and 2nd and 3rd joints black; face and back of head yellow. Thorax yellow, a median short stripe in front, a large heart-shaped spot in centre of disc, two small spots near humen, and two wedge-shaped others at

base of wing, black.

"Yellow, black-marked Abdomen with 1st segment black above, the lour next yellow, with a narrow median interrupted brown stripe, two last segments black, with yellow hind margins; halteres yellow. Wings pale yellow, costa hardly darkened, veins just behind the costa yellow, the others brown. Four anterior legs yellow, tarsi black above at tap, hind femora brownish yellow, hind tibia yellow, a brown short stripe on outer side, and a blackish subapical ring; tarsi with a short brown stripe above." (Westwood)

Length, 18 mm. North part of India Type in the British Museum

# 232. Systropus flavipleura, sp. nov.

σ Ω Differing from ophioneus in having the antennæ all black, except the 1st joint which is indistinctly pale at base. Thoracic markings as follows.—Dorsum black, a diagonally-placed humeral spot, its inner end bluntly pointed, two small contiguous spots immediately below its anterior end and touching the all-yellow propleura, an isosceles triangular spot on posterior corner of dorsum connected by a narrow yellow line with a good-sized spot just before wing-base. Front side of sternopleura bright yellow, the colour continuing up to the 1st abdominal segment; hinder side of lower part of thorax yellow, with a median black stripe. Sides of first four abdominal segments bright golden yellow, remainder of abdomen dark brown

Length, 22-28 mm.

Described from two specimens in the British Museum.

The type of from the Lower Ranges, N Khasi Hills, Assam, 1878 (A Chennell). The second specimen is a Q and bears no data. The Indian Museum possesses one specimen from Sikkin.

# Family THEREVIDÆ.

Head about as wide as thorax, nearly semicircular, neck short, occiput slightly puffed out. Eyes bare, contiguous or subcontiguous in \$\delta\$, wide apart in \$\mathbb{2}\$; from generally more or less produced about base of antennæ, and, with the lace, bare or pubescent; three ocelli. Proboscis rather prominent, of moderate size, rather thick, upturned, labella broad, palpi unjointed. Antennæ often showing excessive or even monstrous development, approximate at base, 3-jointed,\* with usually an apical style; sometimes slender and of considerable length (Phycus), sometimes the 1st joint enormously developed, longer than the head.† The only head-bristles are postocular, and some at the extreme back of the head

Thorax subquadrate or slightly longer than broad, slightly arched, generally with dense pubescence, which is normally longer and thicker in the 3. The macrochete are: 2 to 6 presulural, 1 or 2 supra-alar, 1 strong postalar, 1 or 2 pairs prescutellar, other dorso-central bristles generally absent. Scutellum distinct, semicircular, with four (rarely two) strong bristles on hind margin.

Abdomen of seven segments (rarely more); generally elongatecontrol and in most species with dense pubescence, which is more erect in the 3 than in the 2; no macrochete. Genitalia in 3

1 Mestomyza and others, no genus of this kind is Oriental

<sup>\*</sup> Some authors (as Mik) have claimed four joints in Thereva, Lundbeck even admitting five, but this is incorrect. The 3rd joint sometimes has a basal annulation, which has the appearance of a joint, and the style has sometimes the appearance of being divided

moderately large; in 2 long, shining, with a circlet of spines at

tip as in many ANTHRACINE and ASILIDE.

Legs rather long and thin, with bristles of moderate size, anterior tibus with two or three longitudinal rows of bristles, hind tibus with four rows; all tibus with a circlet of apical spines, pulvilli two or none, empodium reduced to a thin bristle or absent.

Wings with a rather uniform venation; 1st and auxiliary veins not extending much beyond middle of wing; prefure beginning at some distance before base of discal cell, 2nd vein simple, 3rd forked, the fork generally including the wing-tip upper branch of 4th vein forked, 5th vein forked; analyvein present and generally axillary vein also, anterior cross-vein placed at about middle of discal cell, which latter is always present; posterior cross-vein present. Two submarginal, five posterior cells, 4th sometimes closed. "Squamæ with only the alar pair developed, but they are rather large and peculiarly folded, so that the strongly-defined margin is angled about the middle, and gives the impression of

there being two pairs of squame." (Veriall.)

Life-history not definitely known, although on several occasions specimens have been alleged to have been bred from Lepidopterous larvæ (Sphinx, Triphæna, Aleucis) Larvæ very elongate, cylindrical, very active, vermiform, with exserted head; body apparently of 19 or 20 segments, probably caused by subdivision of true segments, amphipneustic, with prothoracic spiracles on 2nd bodysegment, and a posterior pair at sides of 4th segment from tip. last segment small; no pseudopods, but a few fine bustles on first three body-segments. Pupa free, bearing antennal sheaths on front side of head. The larve are found in the earth or in sand, sometimes in decaying wood, occasionally in fungi, turnips, or dung; they are said to be carnivorous. The perfect insects occur chiefly in shady places, on bushes and low-growing plants, Walker and Williston stating that they prey on other insects. although no sufficiently attested case of the kind is known, and they are also stated to be cannibalistic in captivity. Beling and Bouché have supplied most of our knowledge on this subject

The Therevide occur in all parts of the world, but are most numerous in Europe and North America. They are easily recognised by their usually furry appearance, subconical shape, and unmarked wings, and can be distinguished from their nearest allies, the Bombylide, by the five posterior cells and the presence of the posterior cross-vein. Many species are objects of great beauty; amongst Indian representatives of the family may be noted Psilocephala sequa, Walk., which is covered with nearly snow-white pubescence and performs aerial dances in many places. Although the Indian species (except one or two Psilocephala) appear quite distinct, the family is noted for the exceedingly close affinity of some species, characters which at first sight would appear trivial being constant and of quite good specific value.

#### Table of Genera

First autennal joint nearly as long as head First antennal joint much shorter than head

Face and frons with long dense pubes-

Face bare, from bare, or with comparatively short pubescence in d.

Payeus, Walk., p 306

THEREVA, Late, p 297 Psilocfpilala, Žett,

#### Genus THEREVA, Lat.

Thereva. Latreille, Précis Car Gen Ins p. 167 (1796), id., Hist. Nat Crust Ins 111, p 441 (1802)

Genotype, Musca plebeja, L. (Europe).

Head semicircular, placed closely on thorax, from slightly produced towards antennæ, densely pubescent in o, shortly so in Q, a transverse shining black callus present in Q; face sloping, covered thickly (as is all the lower part of the head) in & with dense pubescence, in 2 pubescence much shorter; three ocelli. Proboscis of moderate length, rather upturned, labella large, palpi cylindrical, thin, pubescent. Eyes bare, contiguous in d for some distance, wide apart in Q Antenne porrect, approximate at base, rather long; 1st two joints cylindrical, bristly and pubescent; the 2nd short, 3rd narrowed at base, elongateconical, sometimes indistinctly annulated near base, bare, bearing a short style ending in a minute filament. Thorax oval, densely pubescent in 3, less so in \( \Q \). Three to six presutural, two supraalar, one postalar, and one or two pairs of prescutellar bristles, all strong and black, but the latter ones hable to variation. Scutellum semicircular, with four marginal bristles; metanotum Abdomen conical, longer than thorax, with seven or eight segments in d, the Sth always distinct in Q, forming basal portion of ovipositor; pubescence dense and furiy in d, shorter in Q, and usually adpressed on basal segments. Genitalia not prominent, but often visible, ovipositor with a circlet of strong black spines Legs moderately long, slender; some black bristles on coxe and anterior femora, tibie with rows of small bristles and a circlet of spines at tip Wings with normal Therevid venation, 4th posterior cell generally closed or narrowly open.

Range. World-wide, but apparently better represented in

Europe and North America.

Life-history. Partly known; larve very active, occurring in damp earth, under stones, and in similar places; possibly they feed, at least occasionally, on Lepidopterous larve

Only four species are known for certain from India; these may

be separated as follows:—

Antenno mainly bright brownish yellow . Lompi, sp n., p. 298. Autennie wholly black

Legs all blackash myella, Wied, p 299. 298 THEREVID.E.

Tibiæ brownish yellow

Posterior margins of abdominal segments nariowly and uniformly yellow ...

Posterior margins of abdominal segments ash-grey, much broader town ds sides . . . flavolineata, Brun., p. 299.

bilineata, Brun., p. 300

Four other species are probably from India, but require confirmation

### 233. Thereva kempi, sp. nov.

3 Head with eyes contiguous for about one-third of the distance from vertex to antennæ, with a dull greenish tinge; vertex yellow-dusted, with a few black hairs, ocelli shining black; frons yellow-dusted, rather closely punctured, with long black bristly hairs on upper part, continuing down the sides as far as level of antennæ, rest of frons and whole of face and cheeks covered with dense bright chrome-yellow bristly hairs. Antennæ orange. upper part of 3rd joint, except at base, blackish, as is also the style, 1st joint with conspicuous long black bristles, 2nd with an incomplete circular band of smaller black spines, 3rd with a little whitish pubescence and a few small bristles at base above. Proboscis orange; occiput yellowish, on upper half with short vellow pubescence and a row of strong black bristles along upper margin; lower part behind eyes whitish, with long black hairs. Thorax black, covered with rather dull yellow tomentum and, at least towards sides of dorsum, with short bright vellow somewhat coarse pubescence, the whole dorsum covered with long fine black hairs, which are densest in the centre Scutellum yellow-dusted, darker in centre and at base, with yellow pubescence with a considerable number of long black hairs intermixed; hind margin with four long bristles. Pleure light grey, closely covered with bright yellow pubescence, which is mainly replaced on the sternopleura by white hairs. Abdomen with 1st segment dark grey, with sparse soft black hairs; rest of segments deep black, more or less shining at base, with a well-marked bright golden-yellow hind margin to each, the colour extending forwards towards the sides as far as the middle of each segment or beyond; whole dorsum covered with dense black or yellow pubescence according to the ground-colour. Venter light grev, appearing darker in certain lights, with distinct pale yellowish-white hind margins to segments, the whole surface with sparse soft bright yellow hairs. Legs: coxe light grey, with rather long yellow pubescence; femora black, anterior pairs with similar pubescence, hind pair nearly bare, but with a row of seven or eight black bristles below; tibiæ brownish yellow, blackish at tips, with the usual bristles and microscopic pubescence; tarsi dirty brownish yellow, tip of 1st joint, apical third of 2nd, base of 3rd and 4th narrowly, and all 5th black. Wings pale grey, highly iridescent, 4th posterior cell closed slightly before the border; stigma dark brown; halteres blackish.

Length, 12 mm.

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Described from a perfect unique of in the Indian Museum from Shillong, Assam, 5500 to 6400 it, 29. vii-5 ix 1915 (Kemp).

A very beautiful species, unlike any other Indian form, it must bear considerable resemblance to T. fulva, Mg., of Europe.

#### 234. Thereva nigella, $W_{icd}$

Thereva mgella, Wiedemann, Auss. Zweifl i, p 232 (1828)

Q. "Antennæ blackish, in certain lights whitish Epistome, beard, and moustache white; from and back of head with a white shimmer. The rather jubbed thorax shows faint traces of stripes, the side margins broadly whitish. Abdomen with some white hairs on the side margins, the segments hardly whitish Wings quite clear; halteres brown, with white knobs Legs blackish, with short white hairs Type in Westermann's collection. Tranquebar Length 4\frac{1}{3} lines." (Wiedemann.)

#### 235. Thereva flavolineata, Brun.

Thereva flavolmeata, Brunetti, Rec. Ind. Mus vii, p. 480 (1912).

trons small, black, with black hairs; ocelli red, eyefacets larger in front; face grey, with long stiff black hairs above the antennæ and with long greyish hans below them, antennæ black, microscopically grey-dusted, oral orifice reddish yellow, back of head dead grey, with greyish hans, vertex and upper border of eyes with black hairs. Tho ax dark brown, with two well-separated, moderately wide, chrome-yellow stripes; dorsum covered with mixed brown and yellow hairs, the former mainly on the darker parts, sides of thomax blackish grey in front of wings, ashy grey on lower part, with shaggy durty white hairs in front of and below shoulders, and in front of wing-base, some yellow hairs above insertion of wings A row of three bristles between the humerus and transverse suture, two supra-alar bristles (others possibly Scutellum yellowish, with a brownish basal triangle, dorsum with brown and grey hairs; two preapical well-separated Abdomen blackish grey, posterior margins of segments very narrowly yellow, but more widely so on 3rd and 4th, 1st segment wholly, 2nd, 3rd, and 4th wholly (except posteriorly at the sides), 5th at base, black; dorsum of abdomen with black hairs, which are thickest and longest on the black parts; sides with moderately long whitish-yellow hairs; posterior margins of segments with very short, similarly coloured hairs. Venter bluish grey, posterior margins of segments more broadly yellow, especially on 3rd and 4th segments; the whole surface with soft white hairs. Genitalia distinct, shining brown, with brownish hairs on upper, and whitish hairs on lower parts. Leys (lund pair wanting) coxe and femora blackish grey, the former with long greyish-white hairs in front; the latter with grey hairs below on proximal half, blacker hairs on discal half; tibin reddish yellow,

blackish at tip, microscopically pubescent, with numerous rather short spines, tarsi darker. Wings nearly clear, veins brownish yellow, tegulædirty white; halteres brown and yellow.

Described from a of in the Indian Museum from Shillong.

A second specimen, also from Shillong, 4900 ft, 10-12 x. 1914 (Kemp), is identical, except that the abdominal segments have no pale sides, as in the type, but the hind borders of the 2nd segment and onwards are very narrowly yellowish towards each side, and bear thereon some rather long yellowish hairs.

#### 236. Thereva bilineata, Brun

Thereva bilineatu, Brunetti, Rec. Ind Mus xin, p 78 (1917).

2. Head with from at vertex distinctly more than one-third width of head, at level of antennæ over half the head, its upper two-thirds yellowish brown, the rest (with face) ash-grey; whole from with scattered black hairs of moderate length; face wholly covered with long pendent whitish-grey hairs, extending over cheeks and lower part of occiput, some black hairs below or around mouth, proboses reddish brown, antennæ black, first two joints with strong black bustles, 3rd as long as 1st, vertical triangle barely raised, a row of rather strong bristles along upper occipital margin, a second row a short distance behind the first Thorax dark brown, nearly black, with two distinct, yellowish-white, wellseparated dorsal stripes from anterior to hind margin and minute sparse yellowish pubescence A row of five powerful spines behind humeins, extending towards wing-base, two supra-alar (postsutural), one post-alar, a large and lesser one on each side margin of scutellum and a pair of apical scutellar decussate nearly perpendicular ones. Pleure ash-grey, with long whitish-grey pubescence. Scutellum ash-grey, with a large brown spot at base, hind margin with soft yellow hairs as well as the bristles Abdomen black, 1st segment grey, with yellow pubescence on hind margin and whitish hairs at sides, rest of segments with distinct ash-grey hand borders, which are narrowest in middle, bearing some yellow or vellowish-white pubescence, sides of 2nd and 3rd segments with whitish hairs, lest of dorsum and at sides with short black pubescence; 7th segment shining chestnut-brown; genitalia the same, marked with yellow, fairly prominent, venter black, all segments except 1st with well-defined bare hind margins. Legs. temora black, with depressed white pubescence and a short row of bristles in middle of underside, tibiæ brownish vellow, darker at tips; fore tibie with three (inner pair wanting), posterior pairs with four rows of strong spines; tarsi brownish, yellow or dark brown, joints paler at base, shortly pubescent Wings pale grey. normal; halteres black.

Length, 111 mm.

Described from a unique Q in the Indian Museum from Theog, Simla Distr., 8000 ft., 1. v. 1907 (Annandale).

This species bears some resemblance to my flavolineata.

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#### 237. Thereva cylindrica, Walk.

Thereva cylindrica, Walker, List Dipt. Brit Mus 1, p. 224 (1848)

of "Body long and narrow, head white, hoary behind, with a few black bristles along the hind borders of the eyes, clothed beneath with white hairs, eyes green and red, feelers black, 1st joint clothed with black hairs; 2nd joint and base of the 3rd tawny, mouth piceous, chest hoary, clothed with hoary down, and with a few black bristles on each side, where there is a white stripe, and it has also a broad yellowish-brown stripe in the middle; breast white and clothed with white hairs; abdomen brown, covered with silvery glance, yellowish brown towards the tip, where it is clothed with dark tawny hairs; hind borders of the segments pale tawny and adorned with fringes of white hairs; legs grey, hips white, wings slightly grey, tawny along the fore border; brands brown and narrow; veins piceous, slightly bordered with dark tawny; poisers piceous, with dark tawny knobs

"Length of the body 5 lines, of the wings 8 lines. East Indies"

(Walker.)

Though described from the "East Indies," the type in the British Museum bears the simple label "Ind.", which is considered to signify India proper.

#### 238 Thereva indica, Walk.

Thereva indica, Walker, Ins. Saund., Dipt. pt. 3, p. 159 (1852).

Q "Body black, head shining above, tinged with grey and clothed with hoary hairs beneath, sucker and feelers black; breast tinged with grey, abdomen spindle-shaped, very much longer than the chest, hind borders of the segments and underside tinged with grey, legs tawny, beset with a few black bristles; claws black, wings grey; brands brown, wing-ribs pitchy, veins black, pitchy at the base; poisers pitchy

"Length of the body 5 lines, of the wings 9 lines. East

India " (Walker)

### 239 Thereva persequa, Walk.

Thereva persegua, Walker, Ins. Saund., Dipt. pt. 3, p. 158 (1852).

Q. "Body black, head very shining above, silvery white in front and beneath, where it is clothed with white hairs, sucker black, palpi tinged with grey, thickly clothed with white hairs, chest grey, dull, adorned on each side with a pair of hoary stripes, a pitchy tinge between each pair, sides and scutcheon armed with black bristles, breast hoary, clothed with white hairs, abdomen black, shining, clothed with very short black hairs, slightly decreasing in breadth from the base to the tip, near twice the length of the chest; hind borders of the 1st and 2nd segments tringed with short white hairs; tip armed with a circlet of black spines, legs ferruginous; hips black, tinged with heary, clothed with white hairs, shanks beset with black bristles; feet black, pitchy at the base; foot-cushions pitchy, wings grey, slightly

tinged with brown along the borders of the veins; poisers tawny, their knobs black, with a heavy tinge.

"Length of the body  $3\frac{1}{4}$  lines, of the wings 5 lines. East India."

(Walker.)

#### 240. Thereva invaria, Wall.

Thereva unarra, Walker, Ins. Saund, Dipt pt. 3, p 159 (1852).

Q. "Body black, clothed with black hairs; head clothed beneath with white hairs, sucker pitchy, clothed with tawny hairs, breast and underside of abdomen grey, the former partly clothed with whitish hairs; abdomen spindle-shaped, very much longer than the chest, hind borders of the segments lurid, a large tuft of white hairs on each side of the base, legs black, clothed with short black hairs, beset with a few black bristles; footcushions pitchy, wings slightly grey; wing-ribs pitchy, veins black, strongly marked, pitchy towards the base, brands brown; poisers pitchy.

"Length of the body 5 lines, of the wings 9 lines. East India."

(Walker)

#### Genus PSILOCEPHALA, Zett.

Psilocephala, Zetterstedt, Ins. Lapp. p. 525, note (1838), id., Dipt. Scand 1, p. 19 (1838) (Psilocehala, lapsus).

GENOTYPE, Bibio imberbis, Fln. (Sweden), by Coquillett's designation (1910).\*\*

This genus differs from Thereva in the bare face, and from a nearly allied European genus, Dialineura, which may probably occur in India, it is known by the 1st antennal joint being no broader than the 2nd and not more bristly than usual. The alleged character that the 1st joint is shorter than the 2nd and 3rd combined, as compared with its being longer than the 2nd and 3rd together in Dialineura, seems an uncertain one.

The species are by no means almost bare, as stated by Verrall. Runge. Europe, Asia, North, Central, and South America, North and South Africa, Madagascar, Sokotra.

Life-history. Probably similar to that of Thereva.

Five species are definitely known from India of Ceylon, with one additional species, sequens, Walk., requiring confirmation. These five are difficult to tabulate, from the general similarity of the descriptions, although when placed side by side the species may appear quite distinct. The colour of the legs, though apparently an unreliable character, is perhaps as constant a one as any, but the present table is, at best, only a preliminary one.

the females are known of only three out of the five species

<sup>\*</sup> It would have been better to have selected the well-known European ardea, F, as genotype

#### Table of Species.

1. Femora dark brown, all tibre and tarsi pale yellowish brown, (thorax presumably unstriped)...

Femora black or blackish, with or without white or silvery shimmer . . .

 Front tibiæ blackish brown, or at least distinctly darker than posterior pans All tibiæ (presumably) umformly pale, at most tips darker

at most tips darker

Thorax dull black, with two grey stripes, emarginations of abdominal segments reddish or yellowish

Thorax dark grey, one median darker stripe, abdominal emarginations not coloured, eyes absolutely contiguous albina, Wied, p 303

9.

3

| sequa, Walk , p. 305 | affinis, Kiob.,\* p. 306

indica, Big , p 304.

ceylonica, Kiob, p. 804.

### 241. Psilocephala albina, Wied

Thereva albura, Wiedemann, Zool. Mag 1, pt 3, p 3 (1819), id., Auss Zweifi 1, p 233 (1828)

Psilocephala albura, Kiobei, Ent Mitteil Berl 1, p 252 (1912).

- d "Head with silvery-white tomentum, extreme margins of frontal triangle appearing dark brown; in certain lights can be seen two dark parallel stripes, fading away downwards towards the antennæ, antennæ blackish brown, sparsely beset with black bristles; palpi and proboscis long, with snow-white hairs; back of head with whitish-grey tomentum and white hairs, orbital bristles black Thorax dull grey, with yellow and grey pubescence. scutellum like thorax, with black bristles, sides of thorax blackish, grey-dusted and with grey hairs. Abdomen black, dull, with somewhat strong silvery glistening and long whitish hairs, which in certain lights, especially on the last segment, appear yellow; 2nd to 4th segments with yellowish hind margins, blackish, with grey pubescence, with yellowish hind margins to segments, genital lamelle reddish yellow, with black and whitish-Legs coxe blackish, white-haired, femora dark yellow hairs brown, covered with white pubescence, tibie and tarsi pale vellowish brown, tips darkened Wings hvaline, veins weak, vellowish, 4th posterior cell closed; halteres blackish brown, tips of clubs whitish. Length, 9 mm Type of from Java, in the Vienna Museum
- Q. "Frons narrow, dull blackish brown; epistome shining silvery white, two dull black spots near each other above the antenne, outlined with white; antenne and back of head as in d. Thorax and scutellium black, with very sparse yellowish and grey hairs; sides of thorax blackish, with silvery-white tomentum and white hairs. Abdomen dull blackish brown; each segment bears an ill-defined triangular silver-white spot on each side on the hind

<sup>\*</sup> These two species are almost certain to be identical. No characters of differential value can be selected from Kiober's description of his unique type.

border, not meeting on the disc; according to the light the abdomen above appears deep black or dark brown, 2nd segment with a distinct silky-white margin Ground-colour of venter black, with a silvery sheen, the 1st segment white-haired on each side, the last one short, with black raised hairs. Femora blackish brown, with silvery-white hairs, tibix and tarsi pale yellowish brown, front tarsi darkened Wings as in 3, 4th posterior cell closed. Length, 10 mm. Type 2 from East India, in Vienna Museum" (Krober)

This species is introduced to the British Indian fauna on the

strength of the 2 recorded by Krober from East India

### 242 Psilocephala indica, Big

Psilocephala indica, Bigot, Ann. Soc Ent France, (6) ix, p. 326 (1889)

3. "Antenne blackish, the two first segments furnished with some black hairs; proboscis and palpi blackish, these latter with white hair; face black, covered with whitish tomentum; beard white, thorax dull black, as well as scutellum, two grey stripes on dorsum, sides of dorsum and sides of thorax with white tomentum, halteres brown, pale at tips, abdomen dull black, with venter and sides with white tomentum, the emarginations of the segments reddish, femora black, tibiæ pale tawny with black tips; tarsi brown, metatarsi pale tawny at base; wings hyaline.

Q. "Resembling the male, from black, whitish below, al-

dominal segmentations paler.

"India. Three of of two Q Q. Length, 10 mm." (Bigot.)

### 243. Psilocephala ceylonica, Krob.

Psilocephala ceylonica, Krober, Ent. Mitteil Berl. 1, p. 251 (1912).

3. "With sparse snow-white hairs throughout. Eyes absolutely contiguous, rather large, shining green, epistome and from snow-white, with silvery shimmer, extreme margins of frontal triangle velvet-black, 1st antennal joint black, 2nd and 3rd dark reddish brown, style black, bristles black. Thorax dull dark grev, with a blackish-brown median stripe, which is narrowly bordered with whitish grey; the short erect hairs are blackish, bristles black, scutellum dark grey, blackish brown in centre, sides of thorax silver-grey. Abdominal ground-colour deep velvet-black, appearing wholly black or glistening silvery white according to the direction of the light; posterior margins of segments indistinctly whitish, genitalia small, reddish, tenter like dorsum, borders of segments distinct Femora black, with silvery-white pubescence, tibiæ and tarsi brownish yellow, front tibiæ and tarsi blackish brown, tips of posterior pairs darker. Wings with a brown tinge, rather deeply yellowish brown on anterior margin; veins very strong, slightly infuscated; 4th posterior cell closed in one wing and open in the other; halteres blackish brown, clubs paler. Length, 12 mm. Colombo. Type in Hungarian Museum." (Krober.)

### 244. Psilocephala sequa, Walk. (Pl III. figs. 17-20.)

Thereva segua, Walker, Ins. Saund., Dipt pt 1, p 157 (1852).

3 ♀. Head in 3 with eyes contiguous for about half the distance from frons to vertex, leaving an elongate light yellowish-grey vertex bearing a few brown hairs, with the front ocellus at some distance from the other two; ocelli red, from at level of antenno nearly one-third of the head, and with face wholly covered with snow-white tomentum, with here and there a little short concolorous soft pubescence, upper corner of frons with a few black stiff hairs. Proboscis short, thick, dark brown, extending as far as tip of 1st antennal joint, with moderately long soft white hairs. Antennal 1st joint blackish, white-dusted, with numerous strong black bristles, 2nd and 3rd joints dull red-brown, with a little greyish dust, 2nd nearly cylindrical, with a few short bristles; 3rd elongate, bare. Occiput projecting only slightly behind eyes, covered with hoary tomentum, a little white pubescence, and some strong black bristles In Q, from at vertex broader than in J, widening rapidly to level of antennæ, where it is one-third the width of the head; eye-maigins slightly emarginate towards antennæ; the yellowish-grey colour of the vertex extending halfway to antenne and on its lower margin overlapping the snowwhite frons, a large rounded or subtriangular black spot on each side touching the eyes; vertical margin with a row of about ten black Thorax wholly covered with pale bluish-grey tomentum, dorsum darker, with two narrow well-separated whitish stripes (the intermediate space often brown), running practically from anterior to posterior margins, dorsum covered with fine brownish pubescence of some length, and sparsely with short snow-white hairs; thicker and longer whitish-grey pubescence on the pleure and underside between the first two pairs of coxe. Normal macrochætæ along sides of thorax, dorso-centrals represented by a single pair near hind margin; scutellum, which is clothed with heary tomentum and soft whitish pubescence, bearing four bristles, a marginal and an apical pair. Abdomon in & covered with silverywhite dust, which is most conspicuous seen from above, as, when viewed from behind at a low angle, it almost disappears, the abdomen seeming dusky; there being also some short snow-white hairs, and at the sides much longer fine white or nearly white pubescence, which has a tendency to form a fan-shaped bunch on each segment, especially on the first three; venter blackish, nearly bare; hind margins of 2nd, 3rd, and 4th segments distinctly brownish yellow; tip of abdomen with a few bristles; genitalia reddish brown. In 2, deep black, with microscopic depressed yellow hans, 1st segment wholly grey-dusted, towards sides of each remaining segment a snow-white tomentose triangular spot with short snow-white pubescence; these spots being largest on 2nd and 3rd segments and smallest on 4th, on 5th and 6th segments they are merged in a general whitish-grey dusting; surface of abdomen with sparse long stiff black hairs from 4th segment (on which they are most numerous) onwards, but they are very inconspicuous and easily overlooked; venter covered with snow-white tomentum and some short white pubescence, the bases of some of the apical segments being blackish Legs. coxe and femora clothed with snow-white pubescence; tibix (except tipy) and about basal half of metatars brownish yellow; rest of legs black. Wings pale grey, vitreous, veins towards base yellowish; halteres pale yellowish.

Length, & \$, 9-11 mm

Described from a long series, mostly males, in perfect condition from Pusa, Bengal, where it is apparently to be found from January to July inclusive, it having occurred in abundance on 13 and 14.in. 1909, performing aerial dances between 8 and 9 Am. In the British Museum from Mahagany and Tirryai, Ceylon, taken in January, May, June, September, and November (Col. Yerbury); Castle Rock, 11-26. x. 1916 (Kemp).

#### 245. Psilocephala affinis, Krob.

Psilocephala affinis, Krober, Ent Mitteil Berl i, p 254 (1912).

"d. Near P. ardea, F,\* and P. ceylonica, n sp. The whole body covered with snow-white pubescence, except for some brown hairs intermixed on the thorax. The 1st and 2nd antennal joints black-haired; from and epistome silvery white, extreme margin of frontal triangle deep velvet-black, antenue deep black, thin; back of head grey, below nearly white, orbital bristles black. Thorax dark grey, with two whitish longitudinal stripes, between and beside which the colour appears almost brownish, scutellum like thorax; sides of thorax silvery grey. Abdomen very silvery, metallic, 2nd to 5th segments with snow-white edges; genital lamellæ reddish vellow, venter similar to upper side, groundcolour black, with hind margins of segments white and with silvery reflection. Femora and tarsi black, tibia and extreme base of metatarsı of middle and hind legs yellowish brown; extreme tips of tibiæ more or less blackish brown. Wings absolutely byaline, 4th posterior cell closed; halteres with stalk yellowish, knobs white with black base. Length 9-91 mm. Type of from Agra, in Vienna Museum." (Krober)

Although the expression metallic as applied to the abdomen seems suggestive of specific distinctness, this insect is almost

certainly identical with sequa, Walk

### Genus PHYCUS, Walk.

Phycus, Walker, Ins. Saund., Dipt. pt. 1, p. 2 (1850).

GENOTYPE, Xylophagus canesoens, Walk ; by original designation.

Head transverse, broader than thorax; probosois short, thick, not extending beyond anterior margin of eyes; palpi shorter than

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proboscis, thin; eyes separated in both sexes, bare, from narrower in  $\mathcal{S}$ , or eyes sometimes contiguous in  $\mathcal{S}$ . Antenna porrect, with 1st joint very long, cylindrical; 2nd quite short, 3rd long, longer or shorter than 1st, elongate leaf-shaped, narrow at base, pointed at tip, with distinct short style. Thorax oblong. Abdomen longer than thorax, cylindrical in  $\mathcal{S}$ , rather compressed towards tip in  $\mathcal{S}$ ; genitalia obvious. Legs slender. Wings with venation as in Thereva

The species are rather small, elongate, and nearly bare.

Range. S. Europe (one species), Asia, Australia, South America, with possibly a species from Africa.

Life-lustory unknown.

Only three species are Indian, no other Oriental ones being known.

### Table of Species.

Third antennal joint distinctly shorter than lst, all femora yellow (in var. brunnipes fore femora only pale)

Eyes in both sexes distinctly separated, abdomen without silvery shimmer, but with yellowish-white bands to several segments

Eyes in 5 contiguous for some distance, abdomen (dorsum) wholly covered with brilliant silvery shimmer, transverse bands barely visible

Third antennal joint distinctly longer than lst, all legs wholly black

brunneus, Wied., p 307.

[p 309.

argentiventris, sp. n ,

atripes, Brun , p. 309

# 246. Phyous brunneus, Wied. (Pl III, figs. 21-23.)

Phycus brunneus, Wiedemann, Analec Ent p 10 (1824); Brunetti, Rec Ind. Mus vii, p. 479 (1912)

Xylophagus brumeus, id., Auss Zweifl. i, p. 85 (1828).

Nylophagus canescens, Walker, List Dipt. Brit. Mus. 1, p. 129 Thycus canescens, id., Ins. Saund, Dipt. pt. 1, p. 2, pl. 1, fig. 5 (1850)

3 Q. Head from in 3 less than half as wide at vertex as at level of antenna, where it is between one-third and one-fourth the width of the head, slightly broader throughout in Q; covered on upper half with almost microscopic silver-grey pubescence, lower part shining black, bare, the shining reddish distinct occilii on a small obvious prominence, face broad, with parallel sides and silvery-white tomentum on upper part and also on each side of the antennal prominence, mouth-opening large, black; proboscis rather thick, extending forward about as far as base of antennæ; palpi as long as proboscis, thin, slightly clubbed at tip, black, pubescent. Antennæ normally black; 1st joint sometimes brownish red or dark brown or even brownish yellow, a little longer than head, with microscopic grey pubescence and some short bristly hairs along the underside, beset above with very short stiff hairs, 2nd joint very short, with black bristles; 3rd about

half as long as the 1st, flattened, dull blackish red, practically bare, elongate leaf-shaped, not quite straight nor yet with quite parallel sides, bearing a minute black apical style-like tip. Thorax shining black, with a broad whitish-grey median stripe from anterior to hind margin, often with a narrow whiter line along its middle, transverse suture well marked at each end; whole dorsum covered, though not thickly, with minute whitishgrey pubescence, humer bare, shining, pleure and underside of thorax with greyish microscopic pubescence, with a few sparse longer hairs beie and there. Scutellum reddish brown, base more or less black, sometimes wholly black, with two long black bristles on hind margin. Abdomen shining black, hind margins of 2nd, 3rd, and 4th segments narrowly brownish, yellowish, or even white, the colour always distinctly broader on 2nd segment: sometimes hind margin of 1st segment also faintly or distinctly pale, dorsum covered with minute, rather sparse, whitish pulpescence, which is distinctly longer on the sides and venter, which latter is generally a replica of the upper side and occasionally has the hind margins of the 5th and 6th segments also pale, some longer white hairs towards each side of 1st segment. Genitalia in 3 rather large, black or dark brown; in 2 only the slightly protruding small terminal lamello are visible. Legs brownish yellow or orange, posterior pairs slightly blackish grey at base, all with minute whitish pubescence and a few longer whitish hairs in front and near tip; temora uniformly brownish yellow or orange; tibiæ and tarsi normally black, but middle pair often and hind pair sometimes more or less dirty brownish yellow; tars: blackish, metatarsus more or less dull yellowish at base; all the legs with microscopic grey pubescence. Wings pale grey, highly iridescent, veins black or dark brown, occasionally those near distal end of wing slightly suffused, or the whole wing-tip may be slightly infuscated, halteres wholly yellowish or with a black mark on upper side of knobs

Length, 6-7 mm.

Described from a number of specimens in good and fair condition in the Indian Museum and Pusa collections. Almoin, Kumaon Distr., 5500 ft, 14 v.-10 vi 1911 (Paiva); Dum Dum, W. Himalayas, xii 1906, Baroda, 10 iv. 1909, larva in rubbish in fowl-house, Bombay Presid. (nom. illeg.), 19 iii 1905; Chapra, Bengal, common; Malda, E. Bengal, 22. iii. 1911 (Fletcher), Whatgodam, 23. iv. 1915.

Types in Berlin Museum and Wiedemann's collection.

# P. brunneus var. brunnipes Brun

P. brunneus var brunnipes, Brunetti, Rec. Ind Mus. vii, p. 480 (1912).

This variety is distinguished by a broad brown ring on the posterior femora leaving only the base and tip pale; front femora brownish yellow. Scutellum wholly black, with a little greyish

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tomentum; abdominal bands milk-white. Wings either clear partly suffused along the veins distally, or the tip faintly suffused. Three Q Q from Mandalay, 12. m. 1908, and Moulmen, 28 m. 1908 (Annandale), all in the Indian Museum.

### 247 Phycus argentiventris, sp. nov.

d. Head eyes contiguous for a considerable distance, vertical triangle bluish grey; from and face bluish grey, rather shining; antennal prominence black, antennæ dull brownish yellow, 1st and 2nd joints pubescent; vertical margin and behind upper part of eyes with a row of well-separated black bristles, occiput ash-grey, rather shining in certain lights; lower part with soft white hairs. Thorax as in brunneus, the median stripe with a bluish tinge. Abdomen comparatively flattened above, covered with bluish-grey tomentum, which (seen from in front) glistens silvery white, some sparse white pubescence at sides, longer towards base; hind boider of 3rd segment with a narrow yellowish band, rather inconspicuous; traces of a similar band on 4th segment, genitalia large, conspicuous, bright orange with a little black pubescence, venter black, hind maigin of at least 2nd, 3rd, and 4th segments with a distinct yellowish band Legs: temora and posterior tibiæ blackish, fore tibiæ and tarsi dull yellowish brown; posterior tarsi pale yellowish, blackish at tip and at tips of joints. Wings as in biunnous, unmarked, halteres blackish brown.

Length, 7 mm

Described from a single specimen from Unchogan, Naim Tal Distr., 13. iv. 1910, in the Indian Museum. Specimens subsequently seen in the British Museum from Penyakulam, Ceylon, 22, 23. ii. 1891 (Yerbury).

A very distinct species, characterised by the contiguous eyes and silvery abdomen.

# 248. Phycus atripes, Brun., nom. nov

Phycus nigripes, Brunetti (nec Krober, 1912), Rec. Ind. Mus. vii, p 480 (1912).

Allied to brunneus, but quite distinct owing to the 3rd antennal joint being evidently longer than the 1st and the wholly black legs. Lower half of frons wholly shimmering silvery white, without the large shining jet-black spot immediately above the antennæ which is so conspicuous in both those forms; 3rd antennal joint cylindrical, much narrower than in the other species. Median doisal stripe faint; abdominal bands very narrow, milk-white, only the one on the 2nd segment really distinct. Legs wholly black, including coxæ, which have a little bluish-white shimmer. Wings clear, with a distinct blackish suffusion towards tip, extending from the costa over about the distal half of the 2nd longitudinal vein, reaching irregularly to the hind

margin, just encroaching on the discal cell, and with a small irregular clear space in each of the two submarginal cells; halteres with knobs wholly black. From the narrow frons and the appearance of the abdomen I conclude the single specimen is a  $\mathcal{J}$ .

Length, 10 mm. Kurseong, 27. ni. 1910 (Annandale). Type in the Indian Museum.

# Family SCENOPINIDÆ.

Head nearly semicircular, frons and face nearly flush with the eyes; three ocelli; epistome short, retreating; proboscis very short, labella broad; palpi short, cylindrical, or slightly clavate Eyes bare, generally contiguous in 3, wide apart in \$\mathbb{Q}\$; upper facets larger than lower ones in \$\mathcal{G}\$ with contiguous eyes; in life the eyes with coloured bands. Antennæ three-jointed, placed close together at base, inserted below middle of frons; 1st and 2nd joints short, 3rd elongate, strap-shaped, no style or arista.

Thorax oblong, dorsally rather flattened, with extremely short scaly pubescence on disc and minute pubescence on pleure;

scutellum broad, short, flat, metanotum rather large.

Abdomen flattened, 7- or 8-segmented, each segment with an impressed transverse line across its middle; & genitalia rather large and knob-like; ovipositor concealed.

Legs generally short, moderately stout, tibin unspurred, with a very small bristle or two attip, two pulvilli, empodium reduced

to a bristle

Wings at rest lying flat on abdomen. Costa ending before wingtip, ambient vein fading away at about middle of hind margin; auxiliary vein short, ending at middle of wing, 1st and 2nd longitudinal veins ending shortly beyond middle, 3rd vein beginning near base of 2nd, forking rather widely at half its length; anterior cross-vein present, at about middle of discal cell; 4th vein forked, upper branch ending above wing-tip, lower branch forming basal and hinder sides of discal cell, but barely reaching wing-margin; discal cross-vein closing discal cell;\* 5th vein forked, upper branch short, ending in lower inner angle of discal cell, lower branch turned down rather suddenly, meeting anal vein some way before wing-margin, closing anal cell; axillary vein indistinct. Upper basal cell long, 2nd short, anal cell long; two submarginal, three posterior cells, alar squamæ small, thoracic squamæ almost absent; halteres normal.

The whole body is devoid of strong bristles.

<sup>\*</sup> Lundbeck considers the discal cell technically absent, treating that space as a 4th posterior cell, because he regards the 4th vein as unforked. Presumably, therefore, he sees the posterior cross-vein in the basil portion of the lower branch of the 4th vein, but he does not actually state that the posterior cross-vein is present.

Life-history. The metamorphoses have been well described by Bouché, Dutour, and others. The larva is amphipmental, hard, cylindrical, very elongate, apparently of twenty segments, with small head and two small styles at tip of body, moving in a serpentine manner, abdominal segments with transverse rows of bristles. Pupa resembling that of Thereva The larva was at first thought to live on carpets, rugs, and similar articles, but it is now believed that they live on the other larvæ (of Tinbidæ and Pulicidæ, for instance) that occur in these habitats. They are certainly carnivorous, and probably feed on the larvæ of many different groups of insects, judging from the various situations in which Scenopinus fenestralis has been found.

The Schnofinide are a very limited but distinct family, conspicuous by the absolutely bare body and characteristic venation, coupled with the two pulvilli and bristle-like empodium. Their actual relationships have given rise to various opinions, their characters indicating diverse affinities, such as to Xylomyia, the THEREVIDE, and MYDAIDE Verrall places them with the latter in a super-family, DERMATINA, between the ASLIDE and the THEREVIDE; Lundbeck and Kertész put them between the THEREVIDE and the EMPIDE; Schiner with MYDAIDE between ASLIDE and THEREVIDE; Aldrich between THEREVIDE and BOMBYLIDE

Most of the known species belong to the genus Scenopinus.

### Genus SCENOPINUS, Latr.

Scenopmus, Latrelle, Hist Nat Ins Crust 111, p. 463 (1802), xiv, p. 392 (1804)
Atruchus, Schrauk, Fauna Boica, 111, p. 54 (1803).
Cona, Schellenberg, Gattung d Fliegen, p. 66 (1803).
Hypselura, Meigen, Hing. Mag. 11, p. 273 (1803).
Astoma, Lioy (nec Oken, 1815), Atti Istit. Veneto, (3) 1x, p. 702 (1864)

GENOTYPE, Musca fe restralis, L., by Latreille's designation.

Head transverse, short, semicircular, flattened behind; not closely applied to thorax, but no obvious neck, frons generally flush with eyes; three ocelli; proboscis withdrawn, palpi inconspicuous, cylindrical, tip bristly. Eyes bare, generally contiguous in \$\delta\$, in such cases upper facets larger than lower ones; in \$\varphi\$ wide apart. Antenne sub-contiguous at base; 1st and 2nd joints short, 3rd elongate, drooping, strap-shaped, normally without style or arista, but if present, it is concealed in a depressed pit Thorax longer than broad; dorsum rather flattened, with a little scaly pubescence, pleure minutely pubescent, mesopleura with an obvious depression on front part for reception of the short thick front femora; scutellum short, broad, flat. Abdomen rather flat, oblong, tip flattened cone-shaped, 7- or 8-segmented, middle segments bearing a transverse impressed line across the centre;

front margins of some of the middle segments white in the d; genitalia in & large. Legs short, stout, bare, fore femous shorter and thicker, a few bristly hairs at tips of tibie, two small pulvilli, empodium reduced to a bristle. Wings with a reduced venation; costa ending before tip of wing, ambient vein dying away beyond the tip, auxiliary vein short; Ist and 2nd veins normal; 3rd beginning at middle of wing, widely forked at half its length; anterior cross-vein at middle of discal cell; 4th vein with upper branch ending before wing-tip, lower branch forming basal and hinder sides of discal cell, discal cross-vein closing discal cell; 5th vein forked, upper branch very short, ending in lower inner angle of discal cell, lower branch turned down rather suddenly, meeting anal vein at some distance before border, closing anal cell, 1st basal cell much longer than 2nd; two submarginal, three posterior cells, 1st narrowed at tip; alulæ well developed; alar squame small, thoracic pair hardly developed; halteres small, knobs large

Range Europe, Egypt, India, Surinam, Hawan, N America. Lite-Instory. See S fenestralis.

### 249. Scenopinus fenestralis, L. \*

Musca feneshalis, Linné, Syst Nat ed x, p. 597 (1758). Scenopinus fenestralis, auctt.

Head, in d, dull black, densely and coarsely punctate; from elongate triangular, almost bare, eyes bare, contiguous for some distance, upper facets larger than and sharply divided from lower ones; vertex practically bare; face reduced to a narrow margin owing to the very small mouth-opening, antennæ brownish yellow or nearly blackish, inserted in a smull depression, 1st joint very short, 2nd short, transverse, almost bare, 3rd subulate, four times as long as 1st and 2nd together, slightly narrowed at its blunt tip, where there is a small depression or pit. In Q, frons one-fifth of the head, roughened by coarse punctation and strike radiating from the lower ocellus; generally an impressed vertical median line and minute pale pubescence; eye-margins very distinct, rather puffed out behind on upper part, shining black, sometimes grey-dusted; eyes with a transverse purple band across the middle in life; occiput very concave. Thorax dull black, with minute scale-like greyish pubescence; humeri and posterior calli more or less chestnut-brown, pleure comparatively shining, due to finer punctation, and bearing longer pubescence, both these characters more conspicuous on the sternopleure, pteropleure shining black, bare. Scutellium like dorsum of thorax, generally a little dark chestnut-brown on underside. Abdomen longer than thorax, shining black; 2nd segment twice as long as any other; extreme basal margins in the

<sup>\*</sup> For a very long list of references to this species and for twelve synonyms, see Kertész, Kat Dipt v, p 172

of 4th and 5th, and to a less degree of the 6th (or the membrane between them) conspicuously pure white, this colour not reaching the sides;\* pubescence practically imperceptible; venter shining black, with chestnut-brown reflections and minute black bristly pubescence, genitalia in o large. In the 2 the white transverse bands absent, and the 3rd to the 6th segments with a transverse impressed line across the middle of each; ovipositor small, broad. Legs shining chestnut-brown; coxe and trochanters with blackish reflections; femora occasionally, and tibiæ, especially the hind pair, often, with blackish markings; tarsi black, 1st joint more or less chestnut-brown, also first three joints (except the tips) of hind pair, femora rather short and thick, especially fore pair, hind tibix slightly curved; pulvilli small, brownish orange Pubescence of legs weak and pale, forming small fringes behind anterior femora, and a row of rather long pale hairs behind basal half of hind tibie; spurs absent, but generally a few bristly hairs that appear like spurs Wings pale

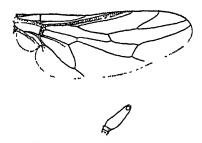


Fig. 22.—Sconopinus fonestialis, L, wing and antenna

brownish grey, veins darker brown; venation in accordance with the generic diagnosis; lower branch of 4th vein and anal vein not quite attaining margin, alar squame small, blackish grey, greyfringed; thoracic puir absent; halteres varying from brown to whitish, sometimes with darker marks

Length, 5-6 mm, the 2 generally slightly the larger

Commonly distributed in Europe and N. America, and the Western Himalayas (hills and plains). Barogh, Simla Hills, 5000 ft., 10 v. 1910, on edge of small stream (Annandale); Kasauli, 6300 ft., 15. v 1908 (Annandale), Naim Tal, 3 & 7 vi 1909, Naim Tal Distr. (plains), 24 & 28. v. 1909. Also recorded from Papua and Hawaii.

The present description of fenestrals is an abbreviation of Verrall's, except for the antennæ, as in the Indian specimens these are normally lighter or darker brownish yellow, not blackish. The legs are also more brownish, especially the femora and tibiæ, than in European specimens, these being the only differences.

\* In one Indian specimen the white extends over the sides, but this is, no doubt, exceptional.

Life-history. Something of this has been known since the time of Dufour, he, Bouché, Frauenfeld, and others having described it, and the species has been bred on numerous occasions. The larva was at first thought to live on carpets, stable-rugs, horse-hair mattresses, and such-like articles, but it was subsequently found in Polypoti, and on willows and other trees. A Sconophius pupa has been found in a cocoon of Saturnia pyre, in which were the remains of the Saturnia pupa, and the species is said to have been bred from decaying wood. The larva is certainly carnivorous, probably living on the larva and pupa of moths and other insects, possibly of fleas also, found in houses, but evidently breeds in the open air also in a similar manner. The larva is elongate cylindrical, rather tough, of about twenty segments, with small brown head, moving in a seipent-like manner, the pupa being slender, with rows of spines and bristles.

Mr. Verrall notes a curious point about this species, that a large number of females are found with the wing-tip broken off, and suggests that it may be done in pairing. In four European fenestrals in the Indian Museum this is the case in two specimens, a third having one wing damaged near, though not actually at, the tip, the fourth being perfect; also in nine Indian fenestrals in the same collection only one wing is thus broken, whilst in five European glab ifrons all the wings are perfect

## Family MYDAIDÆ.

The MYDAIDE are flies of from moderate to gigantic size, easily recognised by their peculiar venation, then projecting club-shaped antenne, and then have surface, being wholly devoid of bristles except for a few on the legs. The prevailing colour is black, with, in many species, bands on the abdomen of red or yellow.

Head about as broad as thorax, transverse, neck short and narrow; from and vertex sunk, making the eyes appear especially prominent, occili indistinct, or, when on a prominence, at some distance from the vertex. Proboscis varying from very long and thin, with small labella, to rather thick and short, with labella of considerable size; palpi, when present, one-jointed, long or thin, but generally absent. Eyes bare, wide apart in both sexes, and never with enlarged facets. Antennæ porrect, approximate or touching at base, the two basal joints normal, 2nd shorter than 1st, with a few bristles or stiff hairs, 3rd joint generally elongate, clubbed or knobbed at tip, with traces of annulations.

Thorax subquadrate, with sparse (rarely thicker) pubescence on dorsum, coarse pubescence at sides of dorsum, humori prominent, pleuræ often with a moderate amount of pubescence, scutellum small though broad, unspined, metanotum very large.

Abdomen elongate, 7-segmented, with light pubescence only; genitalin in of of moderate size, with small foliaceous lamelle

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which are often hidden, ovipositor produced but never elongate, with or without a terminal circlet of spines.

Legs strong and stout, of moderate length, anterior pairs sometimes smaller; hand temora normally slightly thickened, nearly always serrate or spinose below, tibiæ often with a row of small spines on either the middle or hind pair only, or on all three purs; apical tibial spines absent or sometimes present on all three pairs, hind tibia generally with a strong apical spur or two or three bristly spines, tarsi devoid of all but the very small close-set bristles on underside, pulvilli two, moderately large,

empodium absent, claws long

Wings with a very characteristic venation. Auxiliary vein long, 1st longitudinal vein very long, ending at some little distance from wing-tip, prefuica very short, generally extremely so, starting at about one-third of the wing, distinctly before the discal cell, 2nd longitudinal vein always ending in the 1st towards, but not close to, its tip, 3rd longitudinal vein starting very near base of 2nd, always forked at beyond half its length, the branches long, generally curved, and more or less parallel, upper branch ending in the 1st longitudinal just beyond tip of 2nd vein, lower branch ending either at the tip of the 1st vein or in costa just beyond, anterior cross-vein present, short or very short,\* placed much beyond middle of wing, towards tip of discal cell; 4th longitudinal vein with both branches either simple or forked, prongs of either branch or of both branches sometimes recurrent, † normally the antenor prong of the upper branch curves upward and ends in the costa well before the wing-tip, sometimes ending at the tip of the 1st vein. In one (non-Oriental) genus (Mitrodetus), both branches of the 4th vein curve upwards and end in the 1st vein, but this is exceptional Posterior prong of upper branch generally recurrent or nearly so; normally the lower branch of the 4th vein ends in the upper branch, often (as in Mydas) recurrent and united to the apical portion of the upper branch of the 5th vein Discal cell always present, elongate, often irregularly or even fantastically shaped (Mitrodetus); posterior cross-vein normally situated. The 5th vein forks widely, the upper blanch never forming any part of the discal cell, generally curving upwards, joining the lower branch of the 4th vein, or it may be considered to anastomose with the apical part of that vein, thence running jointly with it to the margin, \$\frac{1}{2}\$ lower branch of 5th year ending in 6th (anal) vem near its tip,

I My reading of the branches of the 4th vein differs from that of Verrall, in which the discal cell is said to count two or three veinlets

<sup>\*</sup> Practically, or perhaps actually, absent m only one genus, Megascelus, which is not Oriental.

<sup>†</sup> However, Verrall distinctly says "never running clear to the wing-margin, but always causing a long, closed, normally 4th posterior cell to he under and parallel with the discal cell" The presence of the closed 4th posterior cell referred to does not alter the position, and the vein that runs from the junction of the 4th and 5th rems to the wing-margin may be regarded as the continuation of cither one of them or of the two united

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axillary vein indistinct, perhaps sometimes absent. Alar squame small, nearly bare of fringe, but larger and with coarse fringe in

Mydas; thoracic squamæ absent.

Life-history mainly unknown, except that the larvæ are said to live in decaying wood and to resemble those of the ASILIDE. Williston states that the larva of a North American species (Mydas fulvipes, Walsh) preys upon Coleopterous larvæ, and notes the pupa of M. clavatus, Drury. The perfect insects have been accused of being predatory, but there seems to be little decisive evidence on the matter. An Egyptian species is said to be predatory on other insects, catching them in the air; and another species is recorded as parasitic on the larvæ of Longicorn beetles (Prionide)

The MYDAIDA occur chiefly in the New World and Australia, only about 15 species being Palearetic and six Oriental, of

which four are Indian.

Their peculiar venation differentiates them easily from all other groups, except the Nemestrinide and Apidomitide. These latter are a small non-Oliental group that has been at various times associated with the Bombyllide, Therevide, and Asilide. There is some resemblance in the venation of the Mydalde to that of the Nemestrinide, but the bodily structure and general faces of the latter are different.

The presence also in the NEMESTRINIDÆ of what has been conveniently though incorrectly termed the "diagonal vein" will also immediately separate that family from the present one.

Verrall has calcilly analysed the systematic position of the present family (Brit. Flies, v, p 605), and in the same volume (p. 606) has discussed the question of spelling, several authors having adopted Midas instead of Mydas. The exact origin of the generic name is not clear, and he supports Mydas, with the family name Mydaide, and these terms are also adopted in the Keitész Catalogue and in Williston's Manual

## Table of Genera.

Proboscis short, labella terminal, triangular, compressed; lind tibize generally with a spur, anal segment in Q without a wreath of spines ..... Mydas, I'

Proboscis long, hind tibize without spur, anal segment in Q with a wreath of spines ..... Leptonydas,

### Genus MYDAS, F.

Mydas, Fabricius, Ent. Syst iv, p 252 (1794); Macquart, Hist. Nat. Dipt. i, p. 278 (1834), id, Dipt. Exot. i, pt 2, p 10 (1838).

GENOTYPE, Musca clavata, Drury; by Latreille's designation (1810).

Head broad, short transverse, as broad as thorax, neck short;

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from and vertex sunken, ocelli indistinct or removed far from vertex, proboscis only slightly prominent,\* labella terminal, triangular, compressed, palpr one-jointed, antennæ porrect, at base approximate, clubbed or knobbed at tip, three-jointed, the first two moderately short, the 3rd elongate, with annular im-Thorax subquadrate, with sparse, sometimes thicker pubescence on dorsum and coarse pubescence towards the sides; pleuræ with more pubescence in some species than others, humeri prominent, scutellum oblong, small, unspined, metanotum very large Abdomen elongate, 7-segmented, with light pubescence only, the last segment in the Q without a circlet of spines; genitalia of moderate size in d. Legs strong and stout; hind femora slightly thickened, generally serrate or spinose on underside, hind tibio generally with a spur Wings auxiliary, 1st, 2nd, and 3rd longitudinal veins as in the family diagnosis, both branches of the latter vein ending in the 1st, the 4th vein's upper branch ends in the costa distinctly before the wing-tip, its lower branch bonds downward and joins the upper branch of the 5th vein As for the small vein forming the outer side of the discal cell, it may be regarded as a lower prong of the upper branch of the 4th vein or as a discal cross-vein Remaining veins in accordance with the family diagnosis.

Range S. Europe, N Africa, India, Malay Archipelago, North

and South America, and Cuba

Life-history practically unknown.

## Table of Species

# 250. Mydas ruficornis, Wied.

Mydas ruficorus, Wiedemann, Analec Entom p 20 (1824), id., Auss Zweifl. i, p 242 (1828), id., Monog. Gen. Midas, p 40, pl. lii, fig 11.

"Head black, 1st and 2nd antennal joints black, 3rd fiery redyellow; epistome on both sides [presumably above and below] with yellowish hairs; a white hair spot on the side of the antenna, occupit whitish. Thorax brownish honey-yellow, becoming blackish behind. Abdomen almost metallic black, rather spursely punctured. Wings brown, with violet-blue reflections; halteres brown. Legs black, hind tibia and base of tarsi dark red-brown, hind femora below with three or four rather long spines." (Wiedemann.)

Length, 18 mm.

Tranquebar.

Type in the Vienna Museum

<sup>\*</sup> Schiner adds "with four bristles"

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### 251. Mydas carmichaeli, Brun.

Mydas carmichaeli, Brunetti, Rec. Ind. Mus. ix, p. 266 (1913)

of Q. Head black, from slightly wider than one-third of the head, somewhat winkled, with a moderate amount of blackish-brown pubescence; a small tuft of greyish hairs on each side of the mouth-opening. Proboscis rather less than the height of the head, dark brown; palpi slender, black, reaching as far forward as the vertical line drawn through the antennal prominence, which latter is small and black. Antenna normal, black, bare, about as long as from the vertex to the tip of the proboscis. Occiput black, shortly pubescent; a little grey tomentum behind the eyeborder. Thorax wholly dull velvet-black, with very short sparse black pubescence, which is a little longer below the wings.

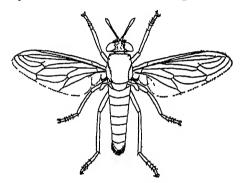


Fig 23 - Mydas car michaeli, Brun., &

Abdomen shining black, with a slight indigo-blue tinge and very short pubescence; in o subcylindrical, as long as head and thorax together and barely as wide, in 2 a little broader and longer and much more bulky. The of genitalia consist of a hollow triangular piece, hairy above, with a deep keel, a pair of dark reddish-brown, nearly bare, moderately long, narrow, finger-like claspers (only one joint being visible, the organs being somewhat withdrawn), and a curved ventral plate, with black pubescence on its lower The Q genitalia appear to consist of two telescopic cylindrical shells, the inner one ending in two small (probably) retractiles Legs wholly black, coxe with a little short black pubescence; hind femora with two rows of spines on underside. an inner one of about a dozen and an outer one of a few only. Hind tibize with a row of reddish spines on underside (not at all conspicuous), and 5 or 6 such spines at the tip on the underside only, fore tibue with some inconspicuous spines at tip, which appear to be only the terminal ones of a row on the underside nearly hidden by the thick though short black pubescence which clothes all the tibie, a row of spines, including the apical ones, is apparently present on the middle tibies also, though certainly

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much less conspicuous. Claws distinct, pulvilli pale brownish-yellow. Wings dark blackish brown, a little paler towards tip and hind margin, and with a strong violet tinge. Halteres and squamæ black, the latter with a narrow fringe of dark brown hairs.

Length, ♂ 25 mm., ♀ 27 mm.

Described from a single pair, the of from Darjiling, v. 1912, the of from Singla, iv. 1913

### 252. Mydas annulata, Brun.

Cephalocera annulata, Brunetti, Rec. Ind. Mus. vii, p. 513 (1912).

d. Head from rather more than one-third width of the head, with a small swelling on each side of vertex, contiguous to the corners of the eyes, proboscs short The whole head moderately shining black, with rather thick and long whitish-grey pubescence over from and face except lower part of the latter, occuput black, with whitish-grey hairs, which are longer on lower part of head. Antennæ all black, long; 2nd joint very short, 3rd joint with an impressed constriction at some distance before its tip; beyond the constriction the joint is slightly thickened; style long, nearly as long as rest of antennæ, black, with an impressed constriction at nearly one-third of its length, the style thickening apically except at extreme tip, where it is slightly but obviously narrower. Thorax black, a grey tomentose stripe at each side of the dorsum. a short one from each shoulder, nairowing rapidly and not reaching centre of doisum, the middle of the posterior margin also grey tomentose, the whole dorsum covered with fine grey pubescence, which is a little longer below the shoulders and on the side stripes. Scutellum broad, extremely short, shining black, bare; sides of thorax moderately shining black, with a little grey pubescence on the pleure. Abdomen shining black; posterior margins of all segments (indistinctly on the 1st segment) with a narrow, but clearly-defined, pale whitish-yellow border; whole surface of abdomen with depressed pubescence, which is dark brown or blackish on basal half (or thereabouts) of each segment and pale grey on apical half Venter similar, the yellowish-white bands passing over the sides of the segments and continued narrowly across the ventral surface Gentalm comparatively small, black; a dorsal plate, a pair of moderately long finger-like claspers, and some yellowish-brown internal organs. Legs black; shortly and normally grey pubescent; base of hind tibiæ and tarsi slightly brownish yellow. Wings pale grey; venation in exact agreement with Macquart's figure of Cephalocera nigra (Dipt. Exot. 1, pt. 2, pl. 1, fig. 3); halteres black.

Length, 15 mm.

Described from two of of in the Indian Museum from Bhoira-kund, Darrang District, Assam-Bhutan Frontier, 18-22. x. 1912 (Kemp).

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I described this species under Cephalocera, as Bigot's MS. name for it was adopted, but, as the proboscis is short and labella are present, it must be referred to Mydas.

### Genus LEPTOMYDAS, Gerst.

Leptomydas, Gerstaecker, Stett Ent Zeit vxiv, p. 81 (1808).

GENOTYPE uncertain, \* Mydas lusitameus, Wied, according to Coquillett (1910)

This genus differs from Mydas in the long proboscis, in the absence of a spur to the hind tibix, and the presence of a wrenth of spines at the tip of the abdomen in the P From Cephalocera it differs by the presence of the labella

Range. South Europe, Egypt, Arabia, Sudan, India, East and

South Africa, North and Central America

### 253. Leptomydas indianus, Brun. (Pl. IV, fig. 1.)

Leptonudas indianus, Brunetti, Rec. Ind. Mus. vii, p. 478, fig. 12 (1912)

- Q. Head much wider than thorax; from black, shining, with two narrow diagonal grooves on upper part, vertex consisting of two dark brown shining oval calli placed end to end, with a small recessed space between them, face rather dark groy, smooth; antenne missing, except the short, cylindrical, dark brown, slightly pubescent first joint, placed on a slight transverse ridge running from eye to eye, eyes prominent, black, bare, shining, proboscis and oral opening dark brown, shining, former very short; back of head grey, the whole frons, face, back, and underside of head with moderately thick (but not dense) grey hairs. Thorax dull black, with a little dirty grey tomentum towards the sides and posterior part, and on the humeral calli, which bear a small bunch of concolorous hairs, similar hairs on posterior part of dorsum, in front of and below the wings; sides of thorax more or less shining black, mostly bare, prothorax and neck with silvery-grey tomentum, scutellum and metanotum blackish, with silvery-grey tomentum. Abdomen cylindrical, slightly marrowed in middle, very dark blackish brown, shining; posterior borders of segments pale yellow, most distinct on 2nd to 5th segments; the bands on the 2nd, 3rd, and 4th segments passing unbroken over the sides and across the venter; 4th segment light reddish brown; whole abdomen minutely pubescent; 1st and 2nd
- \* There is a little uncertainty here, as in the Kertész Katalog lusitanicus is referred to Mydas again, although Leptomydas is acknowledged as a valid genus. The next species given by Gerstaecker is otnetus, Macq, which Kertész pits in Syllegomydas Gerstaecker's third species is rufipes, Wied., which Kertész retains in Leptomydas. Therefore, if Lusitanicus is really a Mydas, the type of Leptotomydas may be rufipes, Wied.

segments with grey hairs at sides. Genitalia small, partly withdrawn, dark shining brown; ultimate portion with a low of light brown scale-like spines on each side Legs simple, no traces of bristles or longer hairs, except two apical bristles at the tips of the anterior tibiæ (the hind tibiæ and tarsi are missing), dark brown, with minute grey pubescence, which is longer on the coxe and short and thick on the tibie; tarsal joints with black tips Wings uniformly pale yellow, veins darker yellow, costa black; border of wing without a single hair; 3rd longitudinal vein with a minute appendix at base of upper fork, alulæ concolorous, bare, tegulæ very small, bright yellow with a very narrow fringe; halteres blackish, stem brown.

Length, 16 mm

Described from a single 2 in the Indian Museum from Sadiya,

The type is a Q, as noted on Bigot's MS label, though in describing it I stated it was probably a J. I placed indianus in Leptomydas because Bigot's MS label bore that name, but an examination of the various genera shows that in this genus the proboscis should be long In indianus it only projects from the mouth-opening for a short distance, the tips of the distinct labella reaching as far forward as the 2nd antennal joint. The only other genus to which it could be referred seems to be Ectyphus, Gerst., in which the proboscis is described as rudimentary, barely projecting from the oral orifice. But the epistome in Ectyphus is long and vertical, whereas in indianus the lower part of the head does not descend below the level of the eyes. The proboscis in the type projects upwards at an angle, if directed forwards, it would, of course, appear comparatively longer: Gerstacker's figure shows a proboscis reaching to half the length of the antennæ. However, the tip of the abdomen bears the circlet of spines, which is one character that differentiates Leptomydas from Mydas, so in the circumstances the species is left here temporarily.

# Family EMPIDÆ.\*

Comparatively small-sized flies, generally bare or nearly so except for a few bristles, of sombre colours; † found chiefly in woods and shady attuations, many species frequenting the neighbourhood of water. In the tropus they occur mostly in localities of some elevation. Systematically much more variety of structure is present than in the adjacent families of Asilion and DOLICHOPODIDÆ.

of the New World

<sup>\*</sup> Some authors adopt the name Empirica. The late G H Verrall says (But Flies, v, p. 28) "Fr A.W Verrall is of opinion that the word Empidica is pedantic, and instances Euclipida."

The only exceptions are a few metallic species from the tropical regions

Head comparatively small, sometimes very small, more or less globular, generally bulging out posteriorly, as wide as, or narrower than the thorax, joined to the thorax by a narrow neck large, often forming nearly the whole of the head, generally bare. contiguous in both sexes or in the donly, or separated in both sexes: in contiguous eves the upper facets nearly always larger than the lower ones; in the middle of the inner eye-margin is an incision of greater or less size, said to be always present and perceptible, three ocelli, Proboscis of various structure; short and thickened, of more moderate size both in thickness and length: or, as is frequently the case, horny, adapted for piercing, directed forwards, or elongate, in some species as long as the whole body. and directed obliquely forwards, downwards, or backwards sionally the proboscis is curved. Mouth-opening generally small Palm generally 1 or 2, rarely 3, jointed, of various structure, size, and length, bare or bristly. Antennæ porrect, approximate at base, sometimes 2-jointed, generally of three unquestionable joints, of which the 3rd may taper into, or bear, an arista, which is always bare except when styliform. In some genera a prominent 1- or 2-jointed style is present, and some authors have described such antennæ as being 4- or 5-jointed. Even in certain genera in which they are regarded as 3-jointed, the 3rd joint (in these cases nearly always elongate conical or pear-shaped) is apparently of a different texture from the basal two, partaking more of the nature of a style In the present work the latter genera are regarded as having a 3-jointed antenna, attention being called to the structure of the 3rd joint. In the genera with socalled 4- or 5-jointed antennæ the 4th and 5th joints are regarded as representing a style. Head with a few weak bristles on vertex. frons, or occuput

Thorax of moderate size, often greatly humped, generally subquadrate, the prothorax sometimes produced forwards Scutellium small, semicircular, or gently curved, with two or more bristles, a few bristles generally occur on the margin of the thoracic

dorsum

Abdomen of 7 or 8 segments,\* bare or pubescent; generally in the  $\sigma$  elongate, conteal, or cylindrical, in some genera short, rounded, or ovate, in the  $\varphi$  sometimes broader at the base, but always more pointed at tip. Genitalia in  $\sigma$  of various structure, sometimes complex and prominent, in  $\varphi$  usually in the form of a slender conical ovipositor with two terminal styliform lamelles. Abdomen never with conspicuous bristles.

Legs exhibiting various forms of structure. In some groups they are comparatively normal, that is to say, of moderate length and thickness, but in others the coxe may be greatly lengthened, the femora (either pair singly or the whole of them) being often conspicuously increassated, and in some genera furnished with spines below. The tibize and metatarsi are sometimes enlarged, whilst marked differences in sexual ornamentation not infrequently

occur in the legs in certain genera—Erupis and Rhamphomyia, for instance,—in which in some species those of the \$\delta\$ are provided with knobs or characteristic spines or tutts of hair, whilst those of the \$\mathbb{Q}\$ in other species may be adorned with long scales forming a conspicuous fringe. Tibial spurs sometimes present, never large, two fairly well-developed pulvilli and generally an empodium of varying shape. Bristles of various sizes and specific value occur on the legs of many species. Some species have raptorial legs

Wings usually of moderate size and normal shape, about as long as the abdomen; in one group narrow and markedly cunerform, the anal angle not distinguishable; in certain genera widened and considerably shortened; practically bare, except for a fringe of tmy bristles along some part of the costa; in the large majority of species unmarked, except for slight infuscations and the stigma, when present Venation exhibiting considerable variety. Costa usually ending near apex of wings, auxiliary and 1st longitudinal veins of varying length, the former sometimes shortened, 2nd longitudinal vein long, simple or forked, 3rd ending before or after wing-tip, simple or forked; 4th simple or forked, the upper branch often again forked, 5th simple or forked, the lower branch often recurrent, meeting anal vein at various angles, analyem present or absent, sometimes much Anterior cross-vein present, posterior cross-vein abbreviated always absent; a discal cross-vein present or absent. One or two submarginal cells, three or four posterior cells, discal cell present or absent, two basal cells, anal cell present, incomplete. or absent. Anal angle of wing prominent, moderately distinct, or entirely reduced. Squamæ generally absent, when present, small. Wings covering the abdomen when at rest

The EMPIDE are a rapacious family, preying chiefly on small soft Diptera and, to a less extent, on Lepidoptera, for which they lie in ambush amongst leaves—Generally distributed, especially in woods in moist situations. In some species aerial dances are performed either by one or other sex or both jointly, copulation in these cases taking place in the air. Other species frequent flowers. Some are fond of hovering in swaims just above small ponds and streams, and mate on the surface of the water—I once saw near London (at Esher, I think) a dense and regular stream of Hilara maura flying slowly backwards and forwards over a brooklet, so that a single stroke of the net captured several hundreds

Life-history Larva amphipmentatic, prothoracic spiracles small, abdominal spiracles also small, placed on last segment, which is more or less rounded, bearing a tooth-like wart on underside; 12-segmented, cylindrical, tapering at each end; head small, retractile, mouth-parts rather well developed, antenna small, no eyes; ventral side of most segments with transverse swellings. The larva is carmivorous, living in the earth below leaves in woods, or in decaying wood, one European species of Hemero-dromia apparently lives in the mud of streamlets. Pupa free, with prothoracic and seven pairs of abdominal spiracles

The EMPIDE may be distinguished from the ASILIDE by the difference in venation, non-excavation of the vertex, smaller head, and absence of long hair on the lower part of the head From the DOLIGHOPODIDE, to which certain genera bear some resemblance, they may be known by the venation. A few genera with reduced venation may have a superficial resemblance to some ACALYPTRATA, but the family characters described above will separate them. The subfamilies are not so easily distinguished as in some other families, and, as a rule, more than one character has to be taken into consideration in separating them.

### Table of Subfamilies.

 Anal cell absent, or, if present, anal vein incomplete and middle femora usually incrassate, anterior crossvein nearly always beyond middle of discal cell

Anal cell present, rarely absent, in which case fore coxe much elongated, about as long as the incrassate fore femora, anterior cross-vein always much before middle of discal cell (except in Hemerodioma app.)

2 Axillary lobe of wing greatly reduced or absent, wing cuneiform at base, fore cove much elongated, about as long as fore femora, always longer than posterior coxe

3 Anal cell always distinctly longer than 2nd basal cell, lower branch of 5th vein bent down to meet anal vein always at an obvious obtuse angle, and approximately perpendicular to hind margin of wing, posterior margin of anal cell always the longer, its apical end never truncate; proboscis shorter than height of head; if longer, directed straight or obliquely forwards and also antenna and style very short. 3rd vein always simple, thorax generally conspicuously himped.

Anal cell shorter than, or at most approximately subequal to 2nd basal cell, lower branch of 5th vern bent down to meet anal vein at an acute angle, a right angle or at most only slightly obtuse angle; approximately either perpendicular to, parallel with,

TACHYDROMIINÆ, p. 373.

HEMERODROMINÆ, p 303.

Навотим, р. 325.

or at an angle of about 45° to hind margin of wing, analcell with either antenor or posterior margin the longer, its apical end truncate or pointed, proboscis generally shorter than or as long as height of head, sometimes longer, 3rd von simple or lorked, thorax humped or not.

4 Probosers as long as or longer than head,\* projecting downwards, lower branch of 5th ven parallel to hind margin of wing, so that anterior margin of anal call is always the longer, antennæ comparatively elongate, generally with 2-jointed style, 3rd ven simple or forked

Proboscis generally quite short, if as long as head or longer, directed straight or obliquely forwards, also 5th vein meeting anal vein at an angle of about 45°, also antenno and style very short. Antennæ variable, lower branch of 5th vein meeting anal vein parallel with, perpendicular to, or at an angle of 45° to hind margin of wing, 3rd vein simple.

EMPINÆ, p 344

OCYDROMINÆ, p. 362

## Subfamily HYBOTINÆ.

By es contiguous in both sexes; proboses varying from shorter than, to a little longer than the head, palpi of one joint; antennæ 3-jointed, with a terminal arista. Thorax very humped. Wings with axillary lobe well developed; 3rd longitudinal vein simple, 4th simple or forked; three or four posterior cells, discal cell generally present; † 2nd basal cell equal to or longer than 1st; anal cell longer or shorter than 2nd basal; anal vein reaching margin of wing, lower branch of 5th vein bent down rather suddenly, at an obvious obtuse angle, meeting anal vein approximately perpendicularly to hind margin of wing, making posterior side of anal cell always the longer, and its apical end pointed.

The characters by which this subfamily may be most easily recognised are the elongated analcell, pointed at tip, in conjunction with the obtusely bent lower branch of the 5th vein; also by the very humped thorax. They are strongly built Empids and of comparatively large size

<sup>\*</sup> Truchopeza is almost an exception, the proboses being barely as long as

<sup>†</sup> Microsania, Zeit., a European genus, has a two-jointed style to the 3rd antennal joint and the discal cell absent

#### Table of Genera

1	Second longitudinal vein beginning nearer humeral cross-vein than anterior cross-vein	2
	Second longitudinal vein beginning nearer anterior closs-vein than humeral cross-	
	vein	4
2	Anal cell ending much before margin of wing	3 [p 334.
_	Anal cell extending to margin of wing .	Harpamerus, Big.,
9	Hind femora incrassate, spined below	SYNECHES, Walk,
U.	Titur tonious inormando, aprica socie	p 327.
	Hind femora not incrassate nor spined below	ACARTERUS, LW,
1	Basal portion of 4th ven (dividing basal	[p 334.
4	- 17.0 - destant	SYNDYAS, Lw, p 333
		DINDIAM, IM, P OM
	Basal portion of 4th vein (dividing basal	5
	cells) distinct	ย
Ð	Hind femora incressate, thoraxvery humped,	TT 3f 990
	ansta apical	Hynos, Mg., p 336
	Hind femora not incrassate, thorax less	[p 343.
	humped, aneta subapical	Parahabos, Keit,

These characters are mainly comparative, especially as regards the origin of the 2nd longitudinal vein. The degree of incrassation of the hind femora and the size of the spines on its underside are both variable characters. The sole characteristic of Syndyas seems a very weak one, whilst that distinguishing Harpamerus appears very strong, yet the latter is sunk in Syneches in Kertész's Catalogue. Both these latter genera are unknown to me. It is difficult to draw definite generic limits in Hybotinæ without an exhaustive examination of all the known species.

### Table of Species of Syneches (sensu lato), Syndyas, and Harpainerus.

	• • • • •	
1	Anal cell extending to wing-maigin . Anal cell ending much before wing-	signatus, Big , p. 334.
2	Thorax bright brownish yellow	2 fp 328. immaculatus, Brun,
	Thorax black, blackish brown, or dark brown	3
3.	Wing with several dark blown marks, apart from stigma	bigoti, Bezzi, p 329.
	Wing unmarked, apart from stigma, ground-colour from clear to brownish	4. [p. 838.
4	Discal cell unusually small Discal cell at least more than twice as	parvicellulatu, Bezzı,
5	long as broad	5
	base or tip), all yellow Legs mainly black or dark brown, at least	<b>6.</b>
	all femora practically so (except hind femora in rusticus)	7.
С.	Thorax less arched, legs with soft pubes- cence in addition to tibial bristles,	
	anal cell considerably longer than 2nd	71 TO 000
	basal, with subconical tip	inæqualis, Brun, p. 330.

Thorax highly arched; legs nearly bare except for tibial bristles, anal cell barely longer than 2nd basal, with nearly truncate tip.

Hind femore brownish vellow.

7 Hind femora brownish yellow
Hind femora black or blackish brown

tinctly brown.

9 Stigma very distinct and large, round, deep black, anterior cross-vern at about \( \frac{1}{2} \) of discal cell, anterior knees and tips of anterior tibus and all turns wholly yellow, hind femora consider-

ably thickened on apical half.
Stigma barely appreciable; anterior crossven at about 1 of discal cell, only tars; and extreme tips of tibue yellow, hind femora not thickened.

10 Leugth 3\frac{1}{2}\text{nm}, 1st posterior cell (beyond discal cell) distinctly narrowed towards tip . . . . . . . . .

Length 5 mm., 1st posterior cell (beyond discal cell) uniformly wide

minutus, Brun , p 330 i usticus, Brun., p 331

9.

10

msigms, Brun., p 332

fratellus, Brun., p. 332.

[p 331.

fusorpennis, sp n., p. 333

Acarterus, Lw, with two Indian species is not included in the above table, as its unthickened unspined hind femora should distinguish it clearly; but Harpamerus is included, although the length of the anal cell should define it with absolute precision. The fact that Prof. Kertész sinks it in Syncoles, however, makes me dubious of its generic validity, Bigot's definitions being often unreliable.

Of the species tabulated above, signatus belongs to Harpamerus, and parricellulata to Syndyas, the remainder falling in Syneches

#### Genus SYNECHES, Wall.

Syneches, Walker, Ins. Saund, Dipt. pt. 3, p. 165 (1852) Acromyu, Latrulle, Gen. Crust. Ins. 1v, p. 305 (1809). Pterospilus, Rondam, Dipt. Ital. Prod. 1, p. 152 (1856).

Genotype, Syneoles simplex, Walk (South America)

This genus differs technically from Hybos by the origin of the 2nd longitudinal vein being nearer to the humeral cross-vein than to the anterior cross-vein. It is also urged that the 2nd longitudinal vein curves forward more in Syneches than in Hybos, also that the anal cell is almost truncate at the tip in the former and pointed in the latter; again, that the wings are normally spotted in Syneches and unmarked in Hybos.

Range. Europe, India, Ceylon, Malay Archipelago, South Africa,

North and South America.

As regards the generic validity of Syneoles, there is considerable doubt, the principal character of the position of the origin of the 2nd longitudinal vein being much weakened by the existence of

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several intermediate species. Melander adds that the 2nd longitudinal vein is curved towards the costa, and the wings (except in one species, dealing with the North American ones only) are

spotted in Syneches

In describing three new Indian species,\* it was noted by me that so far as the origin of the 2nd vein went they might almost as well be placed in Hybos as in Syneches Melander's figure of H spinicosta shows this species also as practically intermediate; whilst in that of mellipes, though the humeral cross-vein is not figured, the origin of the 2nd vein appears also in an intermediate position. Respecting the curvature of the 2nd vein, Melander's figures show it as much curved forward in H. mellipes as in S quadrangularis

The anal cell is said to be nearly truncate at the tip in Syneches and pointed in Hybos, but there is practically no difference in this respect in the wings of S simplex and H mellipes. The character of the wing being generally spotted in Syneches is a weak one

It may be as well, however, to retain Syneches provisionally,

though it is probably only worthy of subgeneric rank

From Epiceia, Walk., and Harpamerus, Big, taken together, Syneches (s str.) is supposed to differ by the 3rd and 4th longitudinal veins being parallel or diverging at the tip, instead of converging at the tip.

My own species must be considered as belonging to Syneches,

sensu lato.

#### 254 Syneches immaculatus, Brun.

Syneches immaculatus, Brunetti, Rec Ind. Mus ix, p. 18 (1913).

3 Head dark grey; upper facets of eyes reddish brown, very much larger than the lower ones, which are coffee-brown; proboscis about as long as height of head, yellow, palpi very small, yellow, with a long bristle at the tips; antennie bright palo



Fig. 24 - Syneches immaculatus, Brun., wing.

yellow, with a very long bisinuate drooping black arista. Thorax bright brownish yellow, with a few sparse hairs and four bristles towards posterior margin, scutellum concolorous, with two long apical bristles; metanotum concolorous; sides of thorax also, an irregular elongate dark brown spot or streak from the shoulder to the base of the wings. Abdomen wholly black, with a little black pubescence on upper- and undersides; genitalia small. Legs yellow; fore femora a little brown above, with short golden-

<sup>\*</sup> Rec Ind Mus. ix, p 17; list of Oriental species and notes, p. 16

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yellow pubescence; all the tibiæ with a row of well-separated long stiff dark hairs. Wings pale grey, unmarked except for the distinct brownsh-yellow stigma; halteres brown

Length, 4 mm.

Described from one of in the Indian Museum from Peradenija, Ceylon, iv. 1911 (E E Green).

#### 255. Syneches bigoti, Bezzi (Pl. IV, fig. 3)

Syneches bigoti, Bezzi, Ann Mus Hung 11, p 360 (1904), Brunetti, Rec Ind Mus 1x, p 16 (1913) Pterospilus bicolor, Bigot, Ann Soc Ent France, (6) 1x, p 126 (1889).

d Q. Head with eyes closely contiguous in both sexes from vertex nearly to base of antennæ, leaving extremely small vertical and frontal triangles, frontal bright brown facets from vertex to lower margin of eye considerably larger than the hindmost black ones, the size gradually diminishing, face moderately broad, blackish, with a little whitish pubescence immediately below base of antenno, the three conspicuous ocelli hight brown, vertex with a row of short black bristly hairs, antennæ wholly brownish yellow, 1st and 2nd joints sometimes darker, the 2nd with a fringe of black bristles towards tip, arista pale yellow, more than twice as long as antennæ; epistome, proboscis, and palpi bright brownish yellow, the last with two or more long bristles and a row of short stiff hairs, occiput black, with a little pubescence. Thorax wholly bright yellowish brown, with three well-separated, moderately wide, more or less distinct darker stripes from anterior to posterior margins; the whole dorsum with very short black pubescence. Scutellum varying from pale yellow to yellowish brown, with a row of short black bristles on hind margin. Abdomen brownish yellow; hind maigins and sides of segments more or less blackish, with yellow pubescence at sides. In the 2 the abdomen more yellowish grey, rather broader basally, contcal at tip, and shorter in d. Venter from pale yellow to yellowish brown; genitalia in of moderate size. Legs anterior pairs pale brownish yellow, sometimes the anterior femora or anterior legs wholly much darker, hind legs always darker than anterior pairs, normally with a very broad darker brown subapical band on femora, sometimes a similar basal brown band, but less distinct, sometimes the hind femora entirely darker brown; hind tibim darker brown, basal and apical thirds usually darker still, hand tarsi pale yellowish, tips of all tarsal joints brownish. Hind femora with soft, black, moderately long pubescence and a row of 8-9 long bristles on outer side and a row of about twelve short socketed spines below; anterior legs with soft short pubercence on femora and tibic and hind tibie also, a row of long stiff hairs below femora and some isolated ones placed apparently irregularly on the tibiæ Wings pale grey, veins brown, but pale vellow on some of the noninfuscated parts and contiguous to the stigma; these infuscations are somewhat irregular in outline and of more or less distinctness,

and occur as follows. In the middle of the wing (narrowly) from costs to discal cell, along basal part of 5th longitudinal vein, and to a slight degree along many of the other veins, at tip of 2nd vein (where there is often a short appendix), and a slight but usually obvious limited suffusion at the wing-tip; stigma very large, deep black, round or slightly oval; halteres brownish vellow.

Length, 4-53 mm

Redescribed from two males and several females in the Indian Museum Margherita, Assam, Perademya, 1 1911, Kandy, v. 1910; Pallode, S. India, 15 xi. 1908 (Annandale); Parambikulam, Cochin State, 1700-3200 ft, 16-24. ix 1914 (Gravely).

### 256 Syneches inæqualis, Brun

Syneches inaqualis, Brunetti, Rec Ind Mus. ix, p 18 (1913).

d Head with occiput dark grey, proboses about as long as head, antennæ blackish grey, arista considerably pubescent. Thorax shining black. Abdomen dull blackish grey (if viewed from in front it appears a lighter grey), greyish towards tip; pale hairs laterally. Genitalia comparatively large, apparently normally formed. Legs wholly yellowish, except tips of femora, which are exceedingly narrowly black, legs softly and distinctly pubescent, the tibis with three or four long stiff bristly hairs on each. Wings pale brownish yellow, stigma oval, indistinct, of moderate size.

Length, 3 mm

Described from a single of in the Indian Museum from Kurseong, 3 viii 1908 (Annandale).

# 257 Syneches minutus, Brun

Syneches minutus, Brunetti, Rec. Ind. Mus ix, p 20 (1913).

d Head with upper facets of eyes large, reddish, lower ones nearly black, much smaller, vertex and occiput black, three distinct small yellowish ocelli. antennæ brown, pale if viewed from above, as is also the arista, proboscis light brownish yellow, a little longer than the head Thoraw very highly arched, dark blackish brown, a little shining; seen from certain directions the hinder half has a brown-dusted tinge, some long stiff hairs laterally. Scutellum with a distinct brown or brownish-grey tinge, and with long stiff hairs Abdomen blackish brown, with some dark hairs; genitalia black, apparently normally shaped and of moderate size. Legs pale brownish yellow; coxe and sometimes extreme base of anterior femora and extreme tips of tarsi dark, legs almost bare except for one or two long stiff hairs on tibie. Wings pale brown, stigma imperceptible, halteres black.

Length, 2 mm

Described from four of on the Indian Museum from the western base of the Dawna Hills, Lower Burma, 1-2 m. 1908 (Annandale)

### 258 Syneches rusticus, Brun.

Syneches susticus, Brunetti, Rec Ind Mus 1x, p. 20 (1913)

3. Head eyes with upper facets ied, the lower smaller ones coffee-brown, three large ocelli, pale yellow and very distinct; antennæ blackish grey, 3rd joint and the rather thick arista paler, proboscis longer than head. Thorax black, only a little shining, some stiff hairs laterally and on posterior margin of scutellum,\* viewed from a low angle at the sides, the anterior part of the mesonotum appears brown-dusted. Abdomen uniformly dark blackish brown, with yellowish-brown hairs laterally; genitalia concoloious, inconspicuous Legs yellowish, pubescent; coxe, major part of anterior femora, tips of all femora (very narrowly), and apical half of all tars, black, hind femora with a row of stiffer long hairs below Wings distinctly brown, but not deeply so, highly indescent, stigmail-defined but distinct; halteres blackish brown

Length, 33 mm.

Described from one of in the Indian Museum taken by me at Darnling, 26 v. 1910

### 259 Syneches palliditarsis, Brun (Pl IV, fig 4)

Syneches palliditarsis, Brunetti, Rec Ind. Mus 1x, p 18 (1913)

Head black; the narrow face a little grey-dusted; eyes above antenno absolutely contiguous, the upper facets reddish brown, the lower facets, which are much smaller, darker brown, proboses shining brown, projecting considerably beyond head (in one specimen twice as long as head), palpi very short, nearly black; antennæ moderately light brown Thorax shining black, when viewed from certain directions it appears distinctly dusted with brownish grey, the anterior part bare, some long soft hairs on posterior half and on scutellum, on the margin of which is a row of long stiff hairs Abdomen black, a little shining, with brownish-yellow hairs, which are a little more plentiful than in the other Indian species of this genus. A peculiar feature in this species is the presence on the underside of the 5th segment of two parallel rows, placed longitudinally a short distance apart, of long soft golden yellow hars. Genetalia elongate Legs dark brown or blackish; tibiæ and tarsi mainly brownish yellow, but base of former and tips of latter darker, femora with rather copious long soft hairs; tibue with similar hairs, less regular and not so long, and with a row of longer stiffer hairs; first two joints of tarsi with two longer stiff hairs at their tips. Ways brownish grey, darker anteriorly, stigma brown, oval, moderately large. halteres dark brown

*Length*, 5 mm

Described from three Q Q in the Indian Museum taken at Sukna, 500 ft., base of Darpling Hills (Annandale), 2. vii. 1908 (type) and 1. vii 1908.

<sup>\*</sup> Most of the bristly hairs are broken off, and therefore cannot be described with exactitude

The palpi in Syneches are theoretically of a length approaching that of the proboscis, but in this species they are quite short, certainly not a fifth part as long as the proboscis. It should, perhaps, constitute the type of a new genus.

#### 260. Syneches fratellus, Brun

Syneches fratellus, Brunetti, Rec Ind Mus 14, p. 18 (1913).

Q Very like S. pallulitarsis, Brun., but quite distinct Eyes and antennæ wholly black. Abdomen without the two fringes of yellow hairs on venter, and the dorsal pubescence of the abdomen is more whitish than yellow. The legs have only the tarsi and extreme tips of the tibiæ yellow, the remaider being black. The wings are nearly clear. It is a much smaller species

Length, 21 mm.

One 2 in the Indian Museum from Bhowali, Kumaon Distr, 5700 ft, 29. vi. 1910 (A. D. Imms).

#### 261. Syneches insignis, Brun

Syneches insigms, Brunetti, Rec Ind Mus iv, p 19 (1913)

d Head with occiput blackish grey, proboses yellowish on apical half, eyes with upper facets much larger than lower ones; antennal 1st joint black (remainder missing). Thorax blackish grey, with microscopic brownish-grey pubescence and soft black hairs variously disposed, humeral calli black, shining, rather



Fig 25 - Syncches insignis, Brun, wing.

prominent, yet small, remainder of thorax, with scutellum and metanotum, blackish; the scutellum with at least two long bristly hairs. Abdomen blackish, with a slight deep blue tinge and sparse pale pubescence. Legs black, with a slight deep blue tinge; anterior knees, tips of anterior tibiæ, and all the tarsi wholly yellowish; the middle tibiæ brown. All the legs with soft black pubescence; hind femora considerably thickened, a row of small teeth and a row of isolated long stift bristly hairs on underside. Wings grey; stigma very large, quite circular, dark brown, placed in the rather distinct curve downwards taken by the 2nd longitudinal vein.

Length, 21 mm

Described from one of in the Indian Museum from Bliowali, Kumaon Distr., 5700 ft., 2 vii. 1910 (A. D. Imms)

### 262 Syneches fuscipennis, sp. nov

d. Head with upper eve-facets bright reddish brown, lower ones dark coffee-brown, vertex blackish; from very small, dark, shining, face very narrow, dark grey, proboscis brownish yellow, barely reaching as far as tip of antenna; palpi moderately long, brownish yellow; antenno brownish yellow, 3rd joint brown, with a long bristle on upperside and very long dark arista which 19 yellowish at base, occiput blackish, very concave, with some long hairs on lower half Thorax subglobular, dorsum hemispherical, dark brown, moderately shining, almost bare, scutellum concolorous, with a row of stiff hairs on hind margin dull black, with moderately long and soft black pubescence; genitalia concolorous Legs come, anterior femora (except at tips), hind femora, and tarsi black, remainder of legs yellow. Pubescence rather long and moderately dense; a row of longer hans on upper and outer sides of anterior tibie, and three long bristles on outer side of middle tibue, pubescence on underside of hind femore a little longer, and on hinder side of hind tibix towards tips conspicuously longer and denser, a row of 6-7 short blant teeth below hand temora on apical half Wings greyish brown; venation normal, halteres yellowish, with black clubs

Length, about 34 mm.

Described from a single  $\sigma$  in the Indian Museum from Talewadi, near Castle Rock, N. Kanara Disti , 3-10. x 1916 (Kemp)

#### Genus SYNDYAS, Lw.

Syndyas, Loew, Of K Vet-Akad Forh. xiv, p. 369 (1857).

GENOTYPE, Syndyas opaca, Lw. (S. Africa); by Coquillett's designation (1910).

The character in which this genus differs from Hybos is the indistinctness of that portion of the 4th longitudinal vein dividing the two basal cells. From Syncoles it differs in the same way, and by the origin of the 2nd vein being more remote from the humeral cross-yein.

No specimen of the genus has come before me, only one Asiatic species having been recorded

## 263. Syndyas parvicellulata, Bezzi.

Syndyas purveellulata, Bezzi, Ann. Mus. Hung. 11, p. 821, fig. 1 (1904).

Q. Head round; eyes above autennæ contiguous, barely separated below by an extremely narrow shining black space; upper facets hardly larger than lower ones, proboscis short, horizontal; palpi black, slender, hare, occilar bristles yellowish, very slender, autennæ wholly black, 3rd joint oval, acuminate, with rather long, very thin arista. Thorax moderately convex, very bright, with whitish hairs, dorso-central bristles very weak,

pale, only the posterior ones a little stronger. Scutellum with two bristles, halteres and squame black, fringed Abdomen slender, acuminate, black, moderately shining, with a slight purplish tinge and pale hairs, which are somewhat longer on the venter, lamelle of ovipositor prominent, blackish brown, with black hairs Legs middle pair shining black, with pale pubescence and short bristles, middle tibie on outer side with a row of five bristles of equal length, posterior tibie clavate at tip, with short bristles on outer side, tarsi with sparse, rather long bristles, posterior femora a little longer than tibie, hardly increasate, with rather weak short bristles below Wings clear, strongly iridescent, with weak pale veins, stigma absent; discal cell extremely small, placed in middle of wing.

Length,  $2\frac{1}{3}$ -3 mm.; wing, 2-2.5 mm

Two females from Colombo, 28 ii 1902, and one exactly similar

from Sattelberg, Huon Gulf, Papua, v. 1899.

Very closely allied to S nitida, Lw, from South Africa Bezzi notes the difference in size of the discal cell as separating his from Loew's species. The form and relative positions of the bases of the 2nd and 3rd longitudinal veins are also different in he two species, according to the figures

### Genus HARPAMERUS, Buy.

Har pamerus, Bigot, Rev Mag Zool (2) xi, p 301 (1859).

"Near Hybos. Head conical, short, proboscis erect, moderately long, palpi porrect, cylindrical, tip with long bristle Antennæ short, two basal joints narrow and inconspictions, 3rd rounded, as long as 1st, compressed, style long, bare, apical Hind femora incrassate, underside with long spines incrassated at their bases. Wings with anal cell large, closed on hind margin of wing."

## 264 Harpamerus signatus, Big

Has pames us signatus, Bigot, Rev Mag Zool (2) x1, p. 306 (1859).

"\$\mathcal{S}\$ \text{Q}\$. Testaceous, abdomen brown at tip. Thorax brown, with three dark stripes. Preboscis pale, palpi brownish. Legs testaceous; hind legs brown, all tarsi pale testaceous or whitish, with black tips. Wings subhyaline, veins infuscated with brownish; stigma hemispherical, brown. Ceylon"

Length, 6 min.

### Genus ACARTERUS, Liv

Acarterus, Loew, Öfv. K Vet-Akad Forh av, p 340 (1858); id, Dipt Fauna Sud-Afr p 262 (1860)

GENOTYPE, Acarterus unicolor, Lw. (S. Africa).

Third antennal joint broad, shortly conical, with a straight bare

apical bristle. Proboscis porrect, horizontal, palpi linear Legs simple, hind femora not incressated or spined below. Wings with 2nd longitudinal vem originating from near base of 1st vem, basal cells subequal

Range. Only three species were till recently known, from India

(pallines), Java, and South Africa, respectively.

The two Indian species may thus be separated —

Larger species, 4 7 to 5 mm, wings clear. pallipes, Bezzi Smaller species, 3 mm., wings brownish. fuscipennis, Brun

### 265 Acarterus pallipes, Bezzi

Acarterus pallipes, Bezzi, Ann Mus Hung n, p 335 (1904)

d ♀ *Head* "Eyes large, flattened above, upper facets distinctly larger than lower ones, ocellar tubercle large, with two bustles, occipital margin with short fine hairs Proboscis horizontal, moderately long, acuminate, shining yellow, darker at base; palpi rather small Antennæ short, wholly clear yellow, 3rd joint rounded, somewhat acuminate in front, with a very fine long bristle above near base, arista nearly subapical, long, fine Thorax moderately arched, hump-backed, black; humeral calli and from wing-base to scutellum dirty yellow, not shunng, in certain lights a light reddish tomentum is visible; the somewhat long acrostichal bustles arranged in four rows; some long hairs posteriorly; scutellum with 10 to 12 dusky yellow bristles on hind margin, halteres large, with brown clubs, squame yellow, with a white fringe Abdomen acuminate, velvet-black, quite opaque, with rather long pale hairs, male genitalia small, but of characteristic shape; the two lateral lamelle forming a kind of forceps, with the branches bent inwards towards the tip Legs all clear yellow, with the tarsi not darkened, not even at the tip, but only the claws black, and rather long and slender; hind femora not at all incressate, without bristles or long hairs, bearing only short, fine pubescence Wings clear, a little yellowish at base; stigma elongate, moderately pale, especially in 2; veins pale yellow "

Length, 4.7-5 mm, wings, 3.9-4 mm Two males and a female from Bombay, 18. vii. 1902.

Types in the Hungarian Museum

# 266. Acarterus fuscipennis, Brun. (Pl. IV, fig. 5.)

Acarterus fuscipennis, Brunetti, Rec Ind. Mus. ix, p 21 (1913).

of. Head with eyes wholly contiguous, the upper facets much larger than the lower ones, bright reddish brown, proboscis reddish yellow, as long as the height of the head; palpi brownish yellow, very small: antenne brownish, with long arista, back of head blackish. Thorax dull black, highly arched, with a few hairs; a few lateral long stiff hairs, also some towards posterior

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margin, sides similarly coloured or dark grey; scutellim with a fringe of long dark hairs. Abdomen black, scarcely pubescent; venter a little pale. Leys bright light brownish yellow, a little pubescent, coxe and basal half of femora black; tarsi-tips blackish. Underside of hind femora and outer side of posterior tibies with a few long stiff hairs. Wings brownish, stigma darker brown; halteres large, black.

Length, 3 mm

Described from two of taken by Mr. E. E. Green at Perademya, Ceylon, vi 1910 (type in Indian Museum), and v. 1911 (in Mr. Green's collection).

### Genus HYBOS, Mg

Hybos, Meigen, Illig Mag. 11, p 269 (1803)

GENOTYPE, Musca grossipes, L. (Europe)

Head small, subspherical; eyes occupying practically all the front side of the head, contiguous in both seves from vertex to antennæ, upper facets ( $\mathcal{S} \supseteq$ ) larger than lower ones, demarcated by an impressed line; three occili on the extremely small, prominent vertex, epistome small, cheeks absent, the eyes extending downwards to oral opening. Proboscis not longer than height of

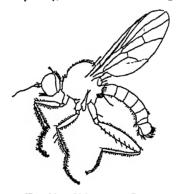


Fig 26 -Hylos apicis, Brun

head, directed horizontally forwards, palpi comparatively long, 1-jointed. Antennæ adjacent at base, inserted (seen in profile) at middle of head, 3-jointed, 1st and 2nd joints short, 1st more or less cylindrical, 2nd subglobular, with bristles, 3rd oval, longer than 2nd, with long arista, which may be pubescent on basal portion. Thorax rectangular, strongly arched or humped: dorsum with more or less distinct short stiff hairs arranged approximately in dorso-central and acrostichal rows; two notopleural (plus sometimes a third weaker one) and some postalar bristles; metapleura bare. Scutellum with two stronger and

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some smaller marginal bristles Abdomen subcylindrical slightly curved, slightly pubescent, of eight segments, the eighth often more or less hidden, the 2nd longest dorsally; genitalia asymmetrical, ovipositor terminating in two small styliform lamellæ Legs of moderate length, hind pair rather longer, hind femola slightly thickened and with rows of spines below, anterior fibring generally with apical spirs. Legs considerably pubescent, the male in some species with long characteristic hairs on anterior tibins and tarsi. Empodium small, narrow, ending in a long bristle. Wings well developed, comparatively broad; axillary lobe distinct, 3rd vein simple; upper branch of 4th vein simple; discal cell present; anal cell longer than 2nd basal cell, its posterior angle acute, anal vein weak, attaining margin of wing, stigma normally present.

Range Europe, Asia, the Orient, Egypt, Natal, North and

South America, Australia

Life-history unknown
The perfect insects inhabit low bushes and ground-plants in humid and shady situations

	Table of Species	
	Legs partly or wholly distinctly yellow or brownish yellow	2 5.
2	Legs wholly pale yellow	3.
	Legs not wholly yellow	4.
3	Venter vellowish, scutellum black, a greyish depression laterally in front	
	of scutellum	bisetosus, Bezzi, p. 338.
	Venter black, scutellum brownish yel-	
	low, no greyish dopression	tenurpes, Brun ,* p 338
4	Stigma absent; anterior tibie, hind kness broadly and all tarsi, yellow	qayatınus, Bıg , p. 339.
	Stigma present	5.
ñ.	Middle tibie, tips of middle femora, and most of middle tarsi yellow; length	
	3! mm	apicis, Brun., p 340
	Fore tibue, tips of hind femore, and base	• , , , ,
	of hind tibic yellow, length 21 mm	gemoulatus, Wulp, p 340.
ti,	Larger species, at least 5 mm. long	7.
	Smaller species, 2 to 3\ mm long	8.
7	Thorax shining blackish, with two in-	
	distinct dorsal stripes; wings nearly clear, land tarsi without golden- yellow pubescence below	niger, Brun., p. 340.
	Thorax blackish grey, unstriped; wings pale brownish grey; hind tarsi with conspicuous golden-yellow pubescence below.	auripes, Brun., p 341
	MOTO AA *********************************	the free same is

<sup>\*</sup> May be synonymous with bisetesis, Bezzi, the distinguishing characters being conceivably within the variation of a single species.

Z

8.	Wings pale grey or clear; stigma indistinct or absent	9.
		nitens, Brun , p 341.
0	70 1 11 1	10
•	יי די ד	
		flavipalpis, Brun , p. 342.
10	Legs black; length 3½ mm	nigi onitidus, Brun , p. 342.
	Legs moderately dark brown, length	-
	2½ mm	brunnipes, Brun., p 343.
	2 mm	ין מונוניון נים באוניים ווים באוניים באוניים ווים באוניים ווים באוניים באונ

#### 267 Hybos bisetosus, Bezzi

Hybos bisetosus, Bezzi, Anu Mus Hung. 11, p. 324 (1904).

"d 2. A very distinct species, characterised especially by the

slender, entirely pale legs.

"Head with eyes wholly contiguous in both sexes, upper facets larger than lower ones, probosers horizontal, as long as palpi, dull yellow, more or less infuscated, occipital margin with a circlet of bristles; antennæ black or brown, 3rd joint elongate oval, thin, with moderately long arista. Thoraw moderately convex, rather brilliant black, anterior margin, pleure, and the broad depression in front of the scutellum covered with grey tomentum; scutellum rounded, with grey tomentum. A long presutural bristle, two pairs of long dorso-central ones; two wellseparated rows of short feeble acrostichal bristles, which are not easily visible; scutellum with two bristles. Squamo and halteres Abdomen shining black, with yellowish venter and pale, moderately long pubescence, obtuse at tip in both sexes, but rather larger in the male, in which the genitalia are large and rounded. Legs rather slender, especially hind femora, which are elongate but hardly increasate. All legs pale yellow, except tips of tarsı and the hind femora towards tips, which are somewhat darkened, especially on upper side Pubescence whitish; fore tibiæ on anterior side near middle with a rather long bristle; middle pair with two very long and strong bristles at the middle, one on the outer and one on the inner side, middle tibin also with other shorter bristles at the middle and tip; hind pair quite incrassate at tip, and ciliated on outer side with short hairs; hind femora armed below with a row of seven or eight long strong black bristles. Wings nairow, hyaline, rather iridoscent; stigma hardly distinguishable from a pale cloud.

"Nine males, eight females, Matheran, 800 metres, S. vii. 02

(Biro)" (Bezzi)

Types in the Hungarian Museum.

# 268. Hybos tenuipes, Brun. (Pl. IV, figs. 7, 8.)

Hybos tenuipes, Brunetti, Rec. Ind. Mus. 1x, p. 13 (1913).

d. Head black; upper eye-facets red, and much larger than the lower ones, which are black; antennæ black, arista four times

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as long as 3rd joint, and distinctly pubescent for the basal two-thirds, the remainder quite bare. Thorax black, shining, sides and metanotum similar, scutellum broad, brownish yellow, the colour extending to the posterior angles of the thoracic doisum. Ibdomen dark brown, with pale pubescence; venter similar. Legs pale yellow. Fore tible with a single long bristle in the middle, middle tible with two such, one at one-third of its length on the outer side, the other just before the middle on the underside; hind femora with a row of five rather long bristles on apical fourth of underside, a long thin bristle in the middle, with two long stiff hairs placed equidistantly between this central bristle and the base; remainder of logs with short pubescence. Wings pale grey, inclining to yellowish on the costa, stigma indistinct, halteres yellow.

Length, 3 mm.

Described from a  $\sigma$  in the Indian Museum from Kurseong, 27. vi 1910 (Annandale)

This is probably Bezzi's bisclosus, but I do not like to sink it definitely until further specimens of both species have been compared.

### 269. Hybos gagatinus, Big. (Pl. 1V, fig 6.)

Hybos gagatina, Bigot, Ann. Soc Ent. Fiance, (6) ix, p 127 (1889). Hybos gagatinus, Brunetti, Rec Ind. Mus ix, p 15 (1918).

d Head with eves reddish brown; proboscis blackish (broken off); antennæ blackish grey, with a very long arista, \* occiput black. Thorax shiring black; a pie-alar bristle, one or two on the pleuræ, and two nearly erect, widely separated, scutellar bristles, lower part of thorax dirty brownish grey (not bluish grey, as noted by me previously) Abdomen and venter blackish. Legs moderately dark shiring brown; anterior tibiæ, the hind knoes broadly, and all tarsi, light brownish yellow. Legs shortly but distinctly pubescent; middle tibiæ with two long bristles on upper half of outer side, two similar apical ones and also two rather long, but more slender ones on distal half of hinder side; all femora with a row of stiff long hairs below; hind femora with a row of well-separated long bristles below, also a row of stout, very short-socketed spines; front metatarsus with three long isolated stiff hairs, in addition to the rather dense, short, ordinary pubescence Wings clear, very indescent; 6th longitudinal vein rather faint; halteres yellowish.

Length, 4 mm.

Redescribed from the unique type in the Indian Museum from Margherita, Assam.

<sup>\*</sup> In my note on this species (vide l. c) it was erroneously stated that the antenne were missing, as on closer inspection it is found that one of them is still wholly intact, though pressed close against the somewhat damaged head.

### 270 Hybos apicis, Brun

Hybos aprois, Brunetti, Rec Ind Mus 17, p 12 (1913)

3. Head black, proboses and palpi light brown, shining; ocular orbits narrowly brown, underside of antenna pale Thorac wholly shining black, bristly haus as in nigronitudus Abdomin black, moderately shining; a few pale hairs at sides, genitalia shining black Legs moderately dark brown, hind femora blackish brown; tips of middle femora, whole of middle tibire, and major part of middle taisi pale yellowish brown; tips of hind femora



Fig 27 -Hybos apicis, Brun , wing

rather broadly, base of hind tibine less broadly, and hind tars wholly (except tips) pale yellowish blown. Bristly hairs as in nigronitidus. Wings nearly clear, stigma oval, brown, halteres brownish yellow.

Length, 31 mm.

Described from one 3 in the Indian Museum from the western base of the Dawna Hills, Lower Burma, 1 iii 1908 (Annandule).

### 271. Hybos geniculatus, Wulp

Hybos geniculata, Wulp, Termés. Fuzet. xxii, p. 137 (1897).

"3 Shining black, antennæ black, 3rd joint nearly elliptical, not longer than 2nd, arista longer than antennæ Thorax especially shining. Abdomen with a slight purple tint. Legs black, with yellowish tarsi, darker at tips, fore tibue yellowish; tips of hind femoia and base of hind tibue reddish vellow. Halteres whitish. Wings grey, with brownish stigma. One male, Kandy, March. Length  $2\frac{1}{2}$  mm." (van der Wulp)

Type in the Hungarian National Museum.

### 272. Hybos niger, Brun

Hybos niger, Brunetti, Rec. Ind Mus 12, p. 12 (1913).

Q. Head black, eyes with upper facets distinctly though not greatly larger than lower ones, both blackish brown, but with inges of red in the former, occiput dark brownish grey, ocular orbit with a fringe of black, well-separated hairs, vertex with two long bristly hairs, antennæ, proboscis, and palpi all black, the latter as long as the proboscis. Thou ax blackish, shining, tending to greyish towards the sides, anterior margin, and shoulders; two narrow well-separated inconspicuous grey dorsal stripes. Dorsum with soft short bairs, and, viewed from certain directions, with brownish tomentose reflections: some

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longer bristly hairs in the usual situations. Scutellium concolorous, with two long bristles and some short stiff hairs; pleuræ and metanotum moderately dark grey. Abdomen blackish, with a moderate amount of pale pubescence, venter similar. Legs wholly black, anterior tibus with long stiff bristly hairs, hind temora with a row of small teeth below, each bearing a strong bristle. Wings nearly clear, stigma distinct but not sharply defined, brown, filling nearly the apical half of the marginal cell and extending to the costa, halteres bright yellow.

Length, 51 mm.

Described from a single Q in the Ludian Museum from Kurseong, 26 vi. 1910 (Annandale).

### 273 Hybos auripes, Brun

Hybos auripes, Brunetti, Rec Ind Mus 18, p. 14 (1913).

3 9. Head black, proboses not much longer than head, tipped with brownish yellow, palpi rather long, pubescent Thorax blackish grey, when seen from certain directions, with a brownish-grey dust, sides dark grey. (Bristles on thorax broken off, but from those remaining apparently consistent with the arrangement in the other species herein described) Abdomen blackish grey, with a brownish cineteous dust, a few pale haus at the sides, genital organs in & large, robust, conspicuous, consisting of an upper and lower thick cup-shaped piece, the former ending in two narrow blunted harry points, the latter ending in two short obtuse bare points, the two pieces together enclosing a large vential chamber in which are some smaller intermediate processes of a yellow colour, the whole of the genitalia, otherwise, being black, with stiff black hairs on the outside In the 2 the organs are small, pale, and inconspicuous Legs black, pubescent; hind femora with a row of about twenty small teeth on underside, each bearing a short spine, in addition, a row of long stiff bristles; anterior tibie with at least two long bristles on inner and two on outer side of each, tarsi black, with pale hairs on underside, those on underside of hind pair golden yellow, and a little golden-yellow hair at the tips of the hind tibia on the underside. Wings pale brownish grey, stigma oval, brown, not very conspicuous; halteres yellow.

Length, 5 mm.

Described from a type of from the Botanical Gaidens, Darjiling, 12. viii. 1909 (Paiva), and a type of from Kurseong, 7.1x. 1909 (Annandale), both specimens in the Indian Museum

## 274. Hybos nitens, Brun.

Hybos nitens, Brunetti, Rec. Ind. Mus. ix, p. 13 (1913),

Q. This species has considerable general resemblance to both brunnipes, Brun., and fuscipennes, Brun. The head is dull black, including the very short proboscis, the palpi, and the antennee. Body shining black, with soft, rather numerous pale hairs. Legs very dark brown, nearly black, with distinct though rather short

pale pubescence. Wings distinctly brown, paler on apical and posterior parts; stigma very distinct and large, dark brown; venation normal; halteres brown

Length, 2 min.

Described from one 2 in the Pusa collection taken at Pusa, April 1908.

Type in the British Museum.

H nitens is distinguished from biunnipes by the very brown wings and conspicuous large stigma, by the nearly black legs, and especially by the very shining black thorax and abdomen.

From fuscipenns it is separated by the shining black thorax and abdomen, the black proboscis, the very dark legs, and its

smaller size, 2 mm. as compared with 3 mm.

### 275. Hybos flavipalpis, Brun.

Hybos flavipalpis, Brunetti, Rec Ind. Mus ix, p. 14 (1913)

d Head. eyes with upper facets much smaller than usual, but larger than lower ones, antennæ black, proboscis black, shining, palpi yellowish, occiput blackish, with a row of well separated, curved, stiff black hairs, placed some distance behind the cyemargus, two bristles on vertex. Thorax shining black, stiff bristly hairs laterally towards posterior margins and two on the shining black scutellim. Abdomen black, moderately shining, with rather long and ragged, yellowish-grey hairs at the sides. Tip of abdomen enlarged, genitalia very large, black, shining, with some whitish soft hairs. Legs mainly black, but anterior tibis and tarsi more nearly dark brown, hind tibis distinctly brown towards tips, and slightly enlarged there; hind tarsi also distinctly brown. All the legs normally minutely pubescent, tibis with several long stiff bristly hairs on outer side, hind femora with two rows of small teeth below, bearing bristles. Wings pale grey; stigma present but weak, brownish; halteres yellow

Length, 3 min

Described from one of in the Indian Museum from Kurseong, 25 vi 1910 (Annandale).

## 276. Hybos nigronitadus, Bi un.

Hybos myromiadus, Brunetti, Rec Ind. Mus 1x, p 11 (1913).

\$\delta \cdot \text{Head}\$ black; occiput tinged with dark grey; proboscis almost as long as length of head, palpi nearly as long. Thorax shining black, beset with microscopic reddish hairs; sides of thorax a little greyish, but not at all conspicuously so. Two or three stiff bristly hairs about the base of the wing and one stiff hair on each humerus; a few of unequal length placed in a row on each side of the median line, and at least two of these (the two hindmost) of considerable size, two also at tip of the concolorous scutellum, both thorax and scutellum bear irregularly placed softer hairs. Abdomen shining black, in certain lights with a little greyish reflection, a little black pubescence in \$\delta\$; in \$\mathbb{Q}\$.

the hairs brown and more numerous; genitalia shining black Legs black, shortly pubescent, femora with a row of stiff hairs below, most conspicuous on hind pair; tibiæ with some stiff hairs, including two at tip; knees narrowly brown; underside of tarsi with pale hairs Wings pale grey, highly indescent; venation normal, stigma small, pale brown, sometimes hardly perceptible, halteres yellow.

Length,  $3\frac{1}{4}$  mm.

Described from one 3 and three Q in the Indian Museum: type 3 from Sukna, 500 ft., 1. vii. 1905 (Annundale), type Q from Darjiling, 29 v. 1910 (Brunetti); two additional Q Q from Kurseong, 7-8. vii. 1908, Darjiling, 7000 ft., S. viii. 1909 (Jenkins).

### 277. Hybos brunnipes, Brun

Hybos brunnipes, Brunetti, Rec. Ind Mus. 1x, p. 12 (1913)

Jean blacksh, antenne wholly dark brown. Thorax black, moderately shining; viewed in certain lights it appears dusted with light grey; two bristly hairs on hind margin of scutellium (those on the thorax are mostly broken off). Abdomen brownish black, with pale hairs, genitalia small. Legs moderately dark brown, hind femora with soft grey pubescence; bristly hairs as in the two preceding species. Wings clear, iridescent; no stigma; halteres yellow.

Length, 2½ mm.

Described from one & in the Indian Museum from Kurseong, 8 viii. 1908.

#### Genus PARAHYBOS, Kert.

Paralylos, Kertész, Termés. Fuzet. xxii, p. 176 (1899).

Genotype, Parahybos iridipennis, Kert (Papua).

This genus differs from Hybos only by the subapical arista, the less humped thorax, and the unthickened hind temora. It is also closely allied to Acarterus, Lw., although this latter technically falls into a different section of the subtamily

Only one species is Indian, but Bezzi has described several

from Formosa.

Range. India, Java, Formosa, Papua.

### 278. Parahybos flavipes, Brun.

Parahybos flavipes, Brunetti, Rec. Ind. Mus 1x, p. 21 (1913).

3. Head with eyes above reddish, closely contiguous, the lower facets coffee-brown and much smaller; antennæ yellowish, arista very long, 2nd joint bristly, 3rd with a single bristle above; face deeply sunk, greyish. Thorax wholly dull black, with some soit hairs towards posterior margin and on scutellum, which latter (with the metanotum) is concolorous. Abdomen wholly dull, very dark blackish brown, with pale pubescence. Legs rather bright brownish yellow, except coxe and basal half of femora, traces of

black at tips of femora and tarsi, soft yellow pubescence on legs, no conspicuous bristly hairs. Wings pale giey, stigma indistinct, brown; halteres black

Length, 3 mm.

Described from a single of in the Indian Museum from Sukna,

base of Darjiling Hills, I. vii. 1908 (Annandale).

An immature specimen, probably a Q, from near Bhowali, Kumaon, Western Himalayas, taken by Dr. A D limins, 13 vi. 1910, is apparently this species.

## Subfamily EMPINÆ.

Eyes normally contiguous or subcontiguous in male, well separated in female, in some species narrowly but distinctly separated in both sexes; the frons in the male in such cases sometimes, but not always narrower than in the female. Proboscis varying from a little shorter than height of head to longer than whole body; palpi 1-jointed. Antennæ 3-jointed, with two-jointed style.

Thorax of moderate height, metapleura with bristles, except in

Hılara \*

Axillary lobe of wing well developed, except occasionally; 3rd longitudinal vein simple or forked, 4th vein forked, lower branch of 5th longitudinal vein recurrent, approximately parallel with hind margin of wing, meeting anal vein at an obtuse angle, making anterior margin of anal cell the longer; anal vein of varying length. Four posterior cells; a discal cell; basal cells subequal, anal cell shorter than 2nd basal, squame small or absent

Members of this subfamily may be recognised by the elongated, downwardly directed proboscis in conjunction with the lower branch of the 5th longitudinal vein being parallel to the hind margin of the wing. It includes the largest species of the family (Empis and Ehamphomyia, but both genera include also very small

species).

## Table of Genera.

Third longitudinal vein not forked ...... Rhamphomyia, Mg.,
Third longitudinal vein forked. Rhamphomyia, Mg.,
Tp. 345.

Auxiliary vein not reaching wing-border; upper branch of 3rd vein forming a wider angle with lower branch, often nearly at right angles to it, fore tarsi in male not dilated (or at most only very slightly swollen), metapleura with bristles ....

Auxiliary vein reaching wing-margin, upper branch of 3rd vein forming a smaller angle with lower branch, sometimes almost parallel with it; fore tarsi in male distinctly dilated, † metapleura baie.... Емрів, І., р. 347.

HILARA, Mg., p. 857.

Howlettia, Brun., is not included in the table of genera, being anomalous, but is retained temporarily in this subfamily.

\* This exception only refers to the Oriental genera.

† Rare exceptions occur

### Genus RHAMPHOMYIA, My.

Macrostomus, Wiedemann, Zool Mag 1, p 50 (1817). Rhamphomyna, Meigen, Syst Besch 111, p 32 (1822). Emcepter y 1, Stephens, Syst Cat. Brit Ins 11, p 264 (1829). Rhamphomyza, Zetterstedt, Ins Lapp p. 562 (1838) Holocler a, Schiner, Wien. Ent. Monats 1v, p 53 (1860).

GENOTYPE, Empis sulcata, Mg. (Europe), by Curtis's designation

This genus differs from Empis mainly in the 3rd longitudinal vein being simple. The eyes are proportionately rather larger, and, in the case of contiguous eyes, the larger and smaller facets are more sharply demarcated. The legs, equally as in Empis, show specific diversity in adornment. Wings sometimes considerably dilated, 3rd vein simple; discal cell sometimes very large and extended nearly to wing-margin.

Range. World-wide

Life-history. Beling has described the early stages of some European species. The larva is carnivorous, and hibernates, changing to the pupa in the following spring of autumn. Ithamphoniqua is generally distributed in the same localities frequented by Empis, some species hovering in the air or just above water

It is mainly a temperate zone genus, the Palmarctic and North

American species being very numerous.

Attempts have been made to arrange the species into definite groups, but without much success.

## Tuble of Species.

Thorax bright brownish yellow, an oval black spot on anterior part ....... unifasciata, Brun., p 345.

Thorax grey.

Hind femora with short thick hans

Hind femora with short thick hans above and dark brown scales below Hind femora apparently with only microscopic pubescence ......

humalayana, Bruu., p. 346

griseonigra, Brun , p 346

## 279. Rhamphomyia unifasciata, Brun

Rhamphomyna unifasciata, Brunetti, Rec. lnd Mus ix, p. 20 (1913).

3. Head placed on a neck of moderate length, blackish The 1st and 2nd antennal joints rounded, a little broader at the tips, 3rd as long as 1st and 2nd together, elongate-oval, arista placed at the extreme tip of the dorsal side Thorax bright brownish yellow, an oval black spot on anterior part of dorsum, drawn out to a point on anterior margin; somet in front but diminished in intensity, and in soi posteriorly towards the hind margin; traces of from the hinder corners of the spot toward.

and a trace of a small blackish spot between these lines; scutellum concolorous, rather wide, a little blackish at the base. Abdomen shining, dark blackish brown; venter more or less yellowish; genitaha withdrawn Leys brownish yellow, tibiæ and tarsi barely darker Wings very pale grey, nearly clear; stigma present, but indistinct; halteres brownish yellow.

Length, 3 mm

Described from two of in the Indian Museum from Mundal, Jaunsar division, Dehra Dun, 9000 ft, 12 v. 1910 (type) (C. W. Beebe), and Simla, 12 v. 1908 (Annandale).

#### 280. Rhamphomyia himalayana, Brun.

Rhamphomyra himalayana, Brunetti, Rec Ind. Mus. iv, p. 28 (1913).

Q Head black, occiput moderately dark grey, with black hairs, frons wide, dark grey, three distinct occili on vertex, with a pair of divariente bristles between the two upper ones, antennæ black, proboscis blackish, about as long as the head Thoras moderately dark ash-grey, with two median very narrow whitish lines from the anterior margin, dorsum with short blackish pulpescence, sides, scutellum, and metanotum concolorous Abdomen dark grey, with short blackish pulpescence, venter similar. Genitalia very elongate, terminating in two unusually finger-like lamellæ Legs dark brown, with blackish pulpescence, femora and tibe with a row of stiff hairs, hind femora with thick short black hairs above and dark brown scales on lower side, hind tibe with thickly and more bristly black hairs. IVings pale brownish grey, stigma absent, halteres yellow.

Length, 3 mm

Described from a single 2 in the Indian Museum from Matiana, Simla Disti., 8000 ft., 28-30. iv. 1907 (Annandale).

## 281. Rhamphomyia griseonigra, Brun.

Rhamphomyia grisconigia, Brunetti, Rec. Ind. Mus. ix, p. 20 (1913).

3. Head with eyes dark reddish brown, upper facets much the larger, occiput grey, with stiff black hairs, antenno blackish, 3rd joint elongate, with distinct elongate style; face dark grey; proboscis blackish, shining, brownish towards tip. Thorax dark cinereous grey, lighter grey on shoulders and pleuræ; the centre of the dorsum has a slight brown tinge, with two indistinct longitudinal nairow black stripes. The whole dorsum with short black stiff hairs irregularly situated and some longer bristly hairs in the neighbourhood of the wings, scutellum concolorous, with black hairs on posterior margin, but apparently no very strong ones; metanotum dark grey Abdomen all blackish grey, with very short black hairs. Legs black, shortly black pubescent; tibiæ with

a few stiff black hairs, hind femora apparently with only microscopic pubescence; hind tibix with soft black hairs on outer side, becoming longer towards the tips, where these tibix themselves are gradually thickened, hind metatarsi lengthened and enlarged.



Fig 28 -Rhamphonyjia gi isconiqia, Brun, wing

Wings pale brown, stigma an indistinct darker brown streak; halteres dirty brownish yellow

Length, 4 mm.

Described from a single of from Mundali, 9000 ft, Dehra Dun, 12. v 1910, in the Indian Museum.

#### Genus EMPIS, L.

Emps, Linneus, Syst Nat. 10th ed p. 603 (1758).
Platyptera, Meigen, Ilhg. Mag 11, p 269 (1803).
Pachymeria, Stephens, Syst Cat. Brit 1ns 11, p 262 (1829)
Platypterigna, Stephens, loc. cat. p. 263
Pachymerina, Macquart, Hist Nat. Dipt 1, p 333 (1834)
Errogaster, Macquart, Dipt. Exot. 1, pt 2, p 162 (1839).
Enoplempis, Bigot, Bull. Soc Ent France, (5) x, p 47 (1880).

Gunotype, Empis pennipes, L. (Europe), by Latreille's designation.

Head globular, sometimes elongated or pear-shaped, the occuput in the latter case subconical; some bristles and pubescence occur. eyes normally contiguous in male, sometimes nairowly separated; always more or less distinctly separated in female; in contiguous eyes, upper facets larger than lower ones, not distinctly demarcated; ocellar tubercle prominent. Proboscis from as long as height of head to as long as whole length of body, prominent, strught, directed downwards; palpi 1-jointed, slightly curved. Antennæ 3-jointed, with a distinct 2-jointed style; 1st joint longer or shorter; 2nd short, both more or less bristly, 3rd always the longest, conically tapering, bare; first joint of style always very short, style always bare. Therax approximately rectangular, moderately arched, prothorax distinct. Some weak dorso-central and sometimes acrostichal bristles present, with distinct but not strongly-developed bristles on margin of thorax, generally humeral, post-humeral, notopleural, supra-alar, and postalar. Scutellum with two or more marginal bristles. Abdomen cylindrical in male, broader at base and more tapering posteriorly in female; 8-segmented, the last sometimes hidden. Genitalia in male well developed, consisting of at least two pairs of appendages; in

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temale, in which sex the last three abdominal segments are sometimes suddenly contracted, terminating in the usual pair of styliforin lamellæ Legs comparatively slender, rather long, tho temora occasionally thickened, and more rarely the front or hind metatarsi, or both pairs, more or less dilated, tibia sometimes with apical spurs The ornamentation of the legs variable, some species having fan-like rows of scales or scale-like hairs on the femora or tibiæ, and sometimes on the metatarsi also; bristles and long hairs of specific value often present; all the legs ordinarily with short pubescence. Wings auxiliary vein not reaching margin; 1st and 2nd longitudinal veins long, 3rd forked towards tip, upper branch of 4th vein forked at corner of discul cell, lower branch of 5th vem strongly recurrent, approximately parallel with hind margin of wing, meeting anal vein at a widely obtuse angle and making anterior margin of anal cell much longer than posterior one, anal cell much shorter than 2nd basal; anal vem attaining wing-margin; discal cell present. Axillary lobe of wing well developed; squame small. The shade of the wing is often darker in one sex—in some males almost milky.

Range. World-wide

Life-history. Little definitely known. The larvæ live in most earth in woods, or less frequently in rotting tree-trunks. They are amphipmensus, of twelve segments, and of the usual magget form. They are said to hibernate.

The species of *Empis* are generally distributed, but prefer shaded and somewhat moist situations. Many species occur at times in vast numbers, some hover in the air. Presumably all are carmivorous, preying on soft Diptera and small moths. The mating of some species takes place in the air, and affords a most interesting study,\* others on the surface of water; whilst in other species the curious fact seems established that the male catches some prey and presents it to the female, which devours it during copulation. In one American species a small balloon of minute bubbles is formed, in which a small dead fly, presumably prey, is enclosed, the balloon being discarded after copulation.

## Table of Species.

1. Front tarsi in 3 extraordinantly developed, as long as ismainder of front legs; 2 unknown  First tarsi in 3 not extraordinantly developed,	[p. 340, amplitarsis, sp. n.,
nor as long as remainder of front legs 2. Halteres chalk-white Halteres not chalk-white 3. Upper branch of 4th vein abbreviated	2 fp. 350, albohalteralis, sp. n., 3 4 6

<sup>\*</sup> See Howlett, Ent. Month Mag xhii, p 229, Lundbeck, Dipt. Danica pt 3, p 83, Aldrich, Amer Natur. xxxiii, p 809, Hamm, Ent. Month, Mag (2) xix, p 181, and (2) xx, pp 132, 157

4	Femora and tibue pennate	squamata, Brun, *
•	Femora and tibue not pennate	
_		5 [p 352
•)	Auxiliary vein and 1st longitudinal veins	p 352
	united	ceylomca, Bezzi,
	Auxiliary and 1st longitudinal veins separate.	car bonaria, Brun,
0		
()	Anterior cross-vein between ; and middle of	_ [թ 351
	discal cell	7.
	Anterior cross-vein distinctly before ; of discal	
	cell	11.
6	, , ,	8.
4	Posterior femora and tibico pennate	
	Posterior temora and tibic not pennate	10
8	Ilind tibut shortly pennate on basal half	
	only, in front and behind, proboses 1!	
	times height of head, not reaching base of	
		F 1193
	abdomen, anteno cross-vem at middle of	[p 353.
	discal cell	centralu, † Biun,
	Hand table with a long lange for practically	•
	their whole length, in front and behind .	()
Ω.	Hind metatarsus pennate, proboscis moie than	•
•••	twice height of head, reaching beyond base	
	twice neight of near, reaching beyond base	5 2
	of abdomen, antenor cross-vein between	
	and middle of discal cell	1 ostrata, Brun .
	Hind metataisus not pennate, proboscis 14	
	times height of head, not reaching base of	
	abdomen, anterior cross-vein just before	[p 354,
	middle of discal cell	
7.0		subcilipes, Biun,
10	Dorsum of thorax with three black stripes,	
	legs dark brown; anterior cross-vein at 🐇	[ր 353
	of discal cell, abdomen uniformly grey	griseomgia, Blun,
	Dorsum of thorax with four black stripes,	great great production of
	legs bright orange anterior cross-vem just	
	before middle of discal cell, hind margins	
	of 2nd, 3rd, and 4th abdominal segments	[թ 356.
	black	marginata, Brun .
71		elegans, Brun, p 356
	. Legs pale yellow Legs dark brown	
	rogs mark prown	inconspicua, Brun,
		[ր 357

#### 282. Empis amplitarsis, sp. nov.

3. Head with vertex moderately large, blackish; two long occilar bristles and some smaller ones; upper eye-facets bright brown, smaller lower ones coffee-brown, antennæ black, 3rd joint as long as 1st and 2nd together, subconical, with elongated tip and long style; proboscis brownish yellow, about twice as long as vertical height of head; palpi rather small, upturned, yellowish; occiput dark grey, with the usual bristles. Therax moderately shining blackish, with grey-dusted reflections in certain lights. Abdomen moderately shining dark brown, with short sparse pubescence, which is longer at the sides. Legs uniformly moderately dark brown, except the extraordinarily developed front tarsi, which are a little darker, these latter are fully as long as the rest of the front log from base of coxa to tip of tibia; 1st joint

<sup>\*</sup> May be the Q of carbonaria, Brun. I May be the Q of griscomy a, Brun.

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nearly as long as tibia, flattened, broad at tip; 2nd joint rather more than half as long as first, narrower, cylindrical, thickened, 3rd joint nearly as long as 1st, much increasated, broader and much longer than 2nd and broader at tip than at base; 4th joint about as long as 3rd, narrower, thin, considerably arched, so that the underside forms a large cavity, 5th joint shorter than 4th, moderately incrassated, bluntly conical, claws and pulvilli normal. Pubescence on coxe and femora moderately long and dense, a little thicker on hind femora, with a few longer hairs on outer side; front tibiæ with a row of short hairs on inner side, a row of longer ones on outer side, and a low of very long ones on upper side; middle tibix moderately pubescent, with two long bristles on outer side (one at middle, one preapical), hind tibiæ covered with rather dense, moderately long pubescence and longer hairs, and with a row of quite long hairs on hinder side, anterior tarsi with 1st joint nearly bare except for a few hairs towards tip, romaining joints



Fig 29 -Empis amplitarsis, sp. nov, front leg of male.

with long dense hairs on upper and outer sides, a few short hairs on inner and lower sides, the 4th also bearing a denser bunch on upper side near tip. Wings pale grey, venation approximately normal, anterior cross-vein at \(\frac{1}{2}\) discal cell, halteres moderately dark brown

Described from a single of from the Pusa collection from Belgaum, Bombay Presidency, 2500 ft, 11 viii. 1910 (*Pletcher*),

presented to the British Museum

A label attached by Mr. T. Bambrigge Fletcher says. "Forelegs are stretched out in front and function as antenning; they are not used for locomotion" The extraordinary development of the front tarsi easily distinguishes this species from all other Indian Emple, yet this character is the only one in which it differs from typical species of Empis.

# 283 Empis albohalteralis, sp nov.

d. Head with vertex blackish, from and face moderately dark grey; first two antennal joints yellowish, 3rd black, base narrowly pale, style rather long, proboses black, reaching (bent under body) to middle of abdomen, palpi pale yellowish, curved upwards, rather long, with a few black bristles; eyes with large upper facets bright brown, lower small ones coffee-brown; occiput ash-grey, a marginal row of small black bristles and a more central

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row of stronger ones Thorax shining black, closely and entirely covered with cinereous dust, in which three narrow slightly yellowish stripes of the usual nature can be faintly traced, scutellum and metanotum with dark grey dust, sides of thorax concolorous with dorsum; metapleural hairs yellow. Abdomen blackish, rather shining, with sparse pubescence; hind margin of segments indistinctly pale; venter yellowish, genitalia shining yellowish brown. Legs coxe dull orange, more or less greydusted on basal part, a little pale pubescence in front, remainder of legs orange, hind tibis more brownish towards tips; anterior tarsi blackish brown towards tips, hind metatarsi much enlarged and lengthened, remaining hind tarsal joints black. Wings pale grey, venation normal, anterior cross-vein just before middle of disral cell, halteres conspicuously chalk-white.

Length, 5 mm

Described from one of in the Indian Museum from Zairat, Baluchistan, 8000-9000 it., viii. 1914 (Major Wilson).

Easily recognised from all other species by the conspicuous white halteres.

#### 284. Empis carbonaria, Brun.

Empis carbonaria, Brunetti, Rec. Ind Mus. ix, p 27 (1913)

3. Wholly and uniformly coal-black, moderately shining. Eyes separated by a narrow frons. Antennal 3rd joint distinctly longer than the first two together, and its distal half rather suddenly narrow; style thick, half as long as the joint. Proboscis nearly twice the height of the head, labium brild at the tip.

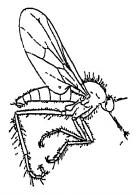


Fig 30.—Empis carbonaria, Brun.

Head, thorax, and abdomen covered with long, soft, but not copious pubescence. Legs dark brown, with rather long soft black hairs; fore femora almost bare; fore metatarsus distinctly incrassated, cylindrical, lengthened, as long as remaining tarsal joints together; hind metatarsus as long as next three joints together,

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slightly thickened, posterior tibise and tarsi with a row of well-separated long bristly hairs. Genitalia small, iounded, not conspicuous Wings clear, antennal cross-vein at one-fourth of the discal cell; 4th vein shortened, stigma slightly brownish, small, halteres black

Length, 4 mm.

Described from two 3 3 in the Indian Museum and one in Mr. E. E Green's collection from Horton Plains, Ceylon, v. 1911 (Green)

Type in the Indian Museum

#### 285 Empis squamata, Brun. (Pl IV, fig. 11.)

Empis squamata, Brunetti, Rec. Ind Mus. 17, p. 27 (1913)

Q Wholly coal-black. Proboscis three times as long as the head Antennæ normal Thorax with soft black hairs. Abdomen nearly bare, roughened, shining, venter similar; ovipositor small, elongate, normal Legs with a dense row of long, closely placed, dark brown scales on underside of fore femora, on upper- and undersides of posterior femora, front and lind sides of fore and hind tibio, outer and inner sides of middle tibio, and on upper sides of all metatars; a single long bristly hair on outer and inner sides, projecting somewhat backwards towards tips of all tibio and of first four tarsal joints, these hairs very much longer on hind legs; the unscaled parts of the legs bear a little black pubescence. Wings pale brown, 4th vein abbreviated, stigma black; halteres black

Length,  $2\frac{1}{2}$ -3 mm.

Described from several Q collected by Mr. E. E. Green on the Horton Plans, Ceylon, May 1911.

Type and other specimens in the Indian Museum.

Probably the Q of carbonaria, having been taken so often by Mr. Green in company with that species However, it must be distinct from ceylonica, Bezzi, with which at first I thought it might be synonymous, as that species has no conspicuous brown scales on the legs, and has the auxiliary and 1st longitudinal veins anastomosed. E squamata has a considerable resemblance to jacobsoni, Meij, described from Java, but in the latter species the upper side of the front femora bears long brown scales like the posterior pairs.

# 286. Empis ceylonica, Bezzi

Empis ceylonica, Bezzi, Ann. Mus. Hung. 11, p. 343 (1904).

Q. A shining black species, distinguished by the broadened brownish wings, with basal third hyaline, pubescence black, but below the setæ the body is bare, proboscis black, as long as head and thorax together, from shining black, bare, head-bristles rather long. Antennæ short, black, shortly pubescent at base; 3rd joint with upper edge straight and excised below, ending in a

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rather long style. Thoraw shining black and bare, with the pleuræ greyish: 2-3 long black metapleural bristles and two moderately long presutural ones, squamæ vellowish, with black fringe Abdomen brilliantly shining black, with a few black hairs; venter with longer hairs on margins of segments; ovipositor long, Wings broadened, axillary angle slender, with elongate lamella developed; 1st longitudinal vein rather long, united to auxiliary vein; 3rd vein bent downwards somewhat towards tip so that it ends at tip of wing, its upper branch nearly perpendicular; discal cell large, apical end truncate; 4th vein rather long, ending at some distance from the margin, 6th vein shortened Leus brown. rather long, especially hind pair, pubescent and with bristles. middle tibix with two long bristles above; hind tibix with 6 or 7 long ones in two rows, hind metatarsus very elongate, as long as remaining joints together, with three or four long bristles above; remaining joints with a single bristle at tip of each.

Length, 3 mm; wing, 4 mm

A unique female from Pattipola, Ceylon, 2000 metres, 22. ii. 1902.

Type in the Hungarian Museum.

#### 287. Empis griseonigra, Brun.

Empis grisconigra, Brunetti, Rec. Ind. Mus. ix, p. 29 (1913).

3. Head with occipit blackish; eyes absolutely contiguous above antennæ; face dark grey; antennæ black, palpi black; proboscis one-fourth longer than the height of the head, dark brownish yellow, black on underside. Thoraw brownish grey, with three moderately wide brown dorsal stripes, the median one attaining the anterior margin, the outer ones only extending as far as the shoulders Some short bristly hairs on shoulders, soft black pubescence over the dorsum generally, and stiffer hairs and bustles distributed as in the other species Sides of thorax a little darker grey, pleure light grev. Abdomen blackish, with short sparse black pubescence; whitish pubescence at sides of the first two segments; genitalia blackish. Legs dark brown, with black pubescence; knees reddish brown, with a trace of this colour over some of the other joints. Wings pale grey; stigma imporceptible; anterior cross-vein at about two-fifths discal cell: halteres bright yellow.

Length, 5 mm

Described from one of in the Indian Museum from Mundal, Jaunsar division, Dehra Dun, 9000 ft., 12. v. 1910 (A. D. Imms)

# 288. Empis centralis, Brun.

Empis contralis, Brunetti, Rec. Ind. Mus. ix, p. 26 (1913).

Q. Head: occiput black, with black hairs above, and some white hairs below; from and face proportioned as in E. rostrata

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but blacksh, as are also the antennæ, but the face, viewed from below, shows dark grey reflections; palpi bright brownish yellow: proboscis one and a half times the height of the head, the upper side brownish yellow Thorax light brownish grey, with soft black pubescence, and bristly hairs laterally and towards the hind margin, two narrow median well-separated brown stripes from anterior margin extending three-fourths of the distance to the scutellum, a lateral broader stripe on each side, practically formed of three irregularly-shaped elongate spots (one on the shoulder, one in front of and one behind the pre-sutural depression), which are contiguous, the hind one attaining the posterior margin of Some bristles laterally and towards hind margin the dorsum. of mesonotum, also four on the scutellum Sides of thorax and metanotum light grey, dorsum of scutellum brownish grey. Abdomen darker grey, with short sparse black hairs, posterior margins of segments more or less black, genitalia elongate, concolorous, much as in E. 1 osti ata; venter dark grey. Legs com dark grey, remainder of legs brownish yellow, extreme tips of femora blackish, and tips of tarsal joints more broadly blackish. All the legs with black pubescence, posterior femora with blackish bristly hair above; hind femora with scales, posterior tibia with blackish-brown scales on front and hind sides, as in E. iostruta, but much less strong and apparently confined to the basal half of the hind pair, on the hind side of the hind tibie a row of moderately long, well-separated bristles. Wings very pale grey, nearly clear; anterior cross-vein directly over the middle of the discal cell, halteres bright brownish yellow.

Length, 5 mm.

Described from one 2 in the Indian Museum from Mundali, Jaunsar division, Dehra Dun, 12. v. 1910.

It seems likely that this will prove to be the female of E. griseonigia.

# 289. Empis subcilipes, Brun.

Empis subclipes, Brunetti, Rec Ind. Mus. ix, p. 24 (1913).

Q Head ash-grey, frons about one-fourth the width of the head, some short stiff black hairs behind the eyes, and some soft white hairs on lower part of occiput; antennæ reddish brown, rather long, black-streaked on upper side and with a whitish shimmer on the inner side in certain lights; antennal style of moderate length, proboscis nearly three times the height of the head, reddish brown, with the underside black. Thorax moderately dark ash-grey, a broad brownish-grey median stripe from the anterior margin and a less distinct much shorter stripe on each side, not extending to the shoulders. Surface of dorsum with short setæ more or less irregularly placed, but a distinct double row in the centre and a number towards each shoulder; some stiff bristles above and in front of each wing and four on

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posterior margin of scutellum, which latter with the metanotum are both light mouse-grey, sides dark grey. Abdomen rather dark grey; lst segment with a little black and grey pubescence; remainder of segments with scattered, very short pale hairs, venter tawny, genitalia very dark brown. Legs brownish yellow, coxæ a little bluish grey on basal half, femora more or less blackish in middle and on upper side generally, tarsi mainly black. Upper and lower sides of four posterior femora with thick but short black chiated hairs; rest of legs finely black pubescent. Wings pale grey, veins brownish yellow on basal part, blackish distally. Anterior cross-vein just before middle of discal cell, stigma imperceptible; halteres brownish yellow.

Length, 51 min.

Described from a single 2 in the Indian Museum from Mundah, Jamisar division, Dehra Dun Distr., 9000 ft., 12 v 1910.

#### 290 Empis rostrata, Brun. (Pl IV, figs. 9, 10)

Empis vostratu, Brunetti, Rec Ind Mus. 11, p. 25 (1913).

Q. Head with occiput grey, with a few bristly black hairs above, from and face concolorous grey, the former comparatively wide, with parallel edges, the latter much wider, antennæ black, 2nd joint very distinctly bright brownish yellow; palpi bright brownish yellow, short; probosers two and three quarter times height of head; reaching beyond base of abdomen, brownish yellow, a little blackish in middle on underside, a few whitish hairs on underside of head. Thorax: dorsum (somewhat discoloured in the centre) light brownish grey, with a narrow median darker brown stripe and a wider one on each side not quite extended to anterior margin of thorax; and laterally two brownish spots, one in front



Fig. 31.—Empis restrata, Brun , wing

of and one behind the presutural depression; sides, scutellum, and metanotum concolorous, or a little more nearly ash-grey. (Thorax denuded of bristles.) Abdomen light groy, brownish at base of each segment, the colour broader in the centre, genitalia slender, cylindrical, terminated by two thin finger-like lamelles, concolorous; venter light grey, unmarked. Legs between light brown and tawny; come a little grey-dusted and with a little soft whitish hairs, tarsi more or less blackish on upper side; extreme tips of femora very narrowly black; posterior femora with blackish-brown scales above and below; posterior tibus with blackish-brown scales, much thicker and larger on hind pair, on which they occur

below the metatarsı also, and are even continued in a less pronounced scale-like form on the underside of the remaining tarsal joints; the legs generally with minute stiff black hairs Wings brownish yellow; anterior cross-vein at two-fifths of discal cell; stigma practically imperceptible, halteres brownish yellow.

Length, 7 mm.

Described from a single Q in the Indian Museum from Theog, Simla Distr, 8000 ft., 1.v. 1907 (Annandale)

#### 291. Empis marginata, Brun.

Pachymeria marginata, Brunetti, Rec Ind. Mus. xiii, p 79 (1917).

Q. Head. from ash-grey, with parallel sides; ocellar triangle large, black; palpi bright orange, antennæ all black, 3rd joint considerably broadened at base, style joints distinct, occiput bluish grey, with bristles and stiff hairs. Thoraw moderately dark grey, with a slight yellowish tinge, two dark median well-separated narrow stripes from anterior margin to well beyond middle; an outer stripe on each side, abbreviated, enlarged into an irregularly shaped and rather indefinite elongated large spot behind the suture, dorsum covered with short black haus, except on the stripes, pleuræ concoloious, with black hairs, a bunch of bristly hairs on each humerus, two macrochete just in front of wingbase, and a fringe of long stiff black hairs on each side of the metanotum, scutellum concolorous, with four marginal bristles Abdomen moderately dark ash-grey; hind margins of segments shining black, the colour extending forwards in centre nearly or quite to anterior margins, 5th segment wholly grey; 6th and 7th grey, shining black basally, venter grey, ovipositor black. Legs: coxe grey, tips brownish yellow, femora in no way incrassated. brownish orange, a brown streak on upper side of fore pair, and traces of such on middle pair, tibie and tarsi brownish yellow, tips of joints of latter black Femora with soft black pubescence, longest on underside of posterior pairs; hind pair with a row of eight or more bristles; tibie with soft black pubescence and longitudinal rows of bristles, tarsi pubescent. Wings very Wings very pale vellowish grey, unmarked; stigma absent, anterior cross-vein just before middle of discal cell, halteres brownish yellow.

Length, 5 mm (to tip of ovipositor).

Described from a single Q in the Indian Museum, taken between Kugri and Phagu, Simla Distr., 21. v. 1906 (Annandale and Kemp). Very like the European femorata, F., which might quite likely occur in the Western Himalayas, but differing radically in the

hind femora showing no trace of incressation.

# 292. Empis elegans, Brun.

Emps elegans, Brunetti, Rec. Ind Mus ix, p. 26 (1913).

Q. Head black, antennæ black; palpi large, yellow; proboscis twice the height of the head, black or blackish brown. Thorace

shining black, including sides, scutellum, and metanotum, wholly unmarked, a little soft whitish hair; distinct bristles apparently absent, a few stiff pale hairs towards hind margin and on scutellum. Abdomen darker brown, nearly bare; genitalia slender, normal, elongate, concolorous. Legs brownish yellow; hind coxe, tips of tibies, and all the tarsi blackish. Femora quite bare; tibies with only a few short stiff hairs towards tips; tarsi pubescent. Wings clear, highly indescent; anterior cross-vein just before middle of discal cell, stigma barely perceptible; halteres brownish yellow.

Length, 3 mm.

Described from two Q Q in the Indian Museum from Mundali, 12. v. 1910, taken in company with E. greeougra

#### 293 Empis inconspicua, Brun.

Empis inconspicua, Brunetti, Rec. Ind. Mus. ix, p. 28 (1913).

3. Head blackish; antennæ black, palpi a little yellowish, proboscis twice the height of the head, yellow above, black below. Thorax of an intermediate shade between light and dark grey, with comparatively long and rather stiff hairs, four long stiff hairs on scutellum, which, with sides of thorax and metanotum, are concolorous, but lighter grey just below shoulders. Abdomen concolorous, rather bread and flat, with parallel sides and soft black pubescence. Genitalia blackish, with reddish-brown bisinuate terminal hooks, venter blackish. Legs uniformly dark brown, pubescent, middle tibix with four long stiff hairs on outer side; hind tibix with long hairs on hinder side. Wings pale grey, anterior cross-vein a little before \( \frac{1}{2} \) of discal cell; stigma brownish, ill-defined, much elongated, and reaching the costal margin, halteres yellow.

Length, 21 min

Described from two of on the Indian Museum from Lucknow, 17.1.1908 (type) and 9. ii. 1908.

# Genus HILARA, My.

Hilara, Meigen, Syst. Besch. iii, p. 1 (1822)

GENOTYPE, Empis maura (Europe); by Curtis's designation.

Allied to both Empis and Rhamphomyia

Head in some species nearly as broad as the thorax, shorter than high. Eyes nearly always separated by a narrow from in both sexes, but in some species contiguous in the male, in which case the upper facets are larger than the lower ones. Antennæ 3-jointed, with distinct 2-jointed style; 1st and 2nd joints short, about as long as broad, bristly; 3rd elongate-conical, bare, slightly compressed; 1st joint of style very short, 2nd elongate, cylindrical. Proboscis about as long as height of head or a little

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shorter; palpi one-jointed, slightly curving upwards rectangular, moderately arched There are normally two strong straight bristles on upper side of prothorax; disc of thorax with weak dorso-central and acrostical bristles; margin of dorsum generally with a humeral, post-humeral, one to three notopleural. one supra-alar, and a postalar bristle, scutellum generally with four bristles, metapleura bare Abdomen slender, of 8 segments. cylindrical in male, with complex and rather uniform genitalia: broader and more pointed apically in female. Legs of normal length and form, fore metatarsus in the male nearly always more or less thickened; in the female the hind tibix not infrequently slightly compressed and curved; occasionally the hind femora in both sexes, or in male only, obviously thickened and suddenly narrowed at apex. Legs moderately pubescent, characteristic bristles often present, tibie generally with apical spurs. Wings as in Empis, except that the auxiliary vein distinctly reaches wingmargin, fork of 3rd vein perhaps less widely open; anal voin weaker, generally failing to attain wing-margin; axillary lobe well developed.

Range World-wide.

Infe-listory. Being has described the early stages of several European species. They appear to resemble the ordinary Dipterous larve and pupe, the former being amplipmentation, of twelve segments, including the head, living in damp earth of amongst decaying leaves. The larva hibernates as in Empis and Rhamphomyia. The perfect insects are generally distributed, more commonly occurring in woods and fields and near water. They prey on small Diptera or other soft insects, and have often been captured in copula still carrying their prey, which is enveloped in a little web, said to be spun from the mouth of the male.

Only four Indian species are described. Walker's bures is unknown to me and may possibly be identical with my compacta.

# Table of Species

# 294. Hilara compacta, Brun.

Hilara compacta, Brunetti, Rec. Ind. Mus. ix, p. 30 (1913).

3. Head blackish, from rather narrow; antenns with grayish reflections viewed from certain angles. Proboscis about as long as height of head, shining black above; labium, which is shining yellowish, much longer than the hypopharynx and sharply pointed, palpi large, nearly as long as proboscis, brownish,

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yellow, pubescent. Thorax wholly dark grey, including sides, scutellum, and metanotum; a little black pubescence, and some stronger hairs on dorsum laterally. Abdomen blackish, pubescent, sometimes pale below at base; genitalia a little broader than the abdomen Legs pale yellowish brown, pubescent, tibiæ with a row of longer stiff hairs on outer side; front metatarsi much



Fig 32 -Hilara compacta, Brun, wing

thickened, as wide as the tibue, and longer than the remaining fore tarsal joints; posterior metatarsi normal, not so long as the remaining tarsal joints. Wings pale grey, stigma elongate, pale brownish, ill-defined; halteres dirty brownish vellow.

Length, barely 21 mm.

Described from three & & in the Indian Museum from Simla, 16. v 1909 (type) and 9. v. 1909 (Annandale)

#### 295. Hilara bares, Walk.

Hilara bares, Walker, List Dipt Brit Mus. ii, p. 491 (1849).

"Body brown, clothed with short black hairs, eyes dark red; feelers and month black; breast hoary; legs tawny, clothed with short black hairs, feet brown; wings light brown, darker for one-third of the length along the fore-border; wing-ribs and veins piceous; poisers brown. Length of the body, 1½ line; of the wings, 3 lines.

"East India Presented by Capt. Parry."

Type in the British Museum.

#### 296. Hilara rufithorax, Brun.

Empimorpha rufithorav, Brunetti, Rec. Ind. Mus. 1x, p. 30 (1913).

3. Head: occiput, frons, which is moderately wide with parallel linear edges, and face all black, with a few black bristles, the latter with a pair of long bristly hairs; vertex with three distinct large reddish occili, with a pair of strong divariente bristles between the upper ones. Antenno yellow; 3rd joint elongate onion-shaped, with a long closely pubescent black arista, ending in a small bare black pointed bristle; the first two antennal joints with some short bristles near their tips. Proboscis about as long as the height of the head, the basal half yellowish, the apical half blackish; palpi very long, longer than proboscis, somewhat broadened and flattened at the tips, with a few yellowish hairs. Thorax bright light yellowish brown, with three black dorsal stripes, of which the median one is of moderate width, the

outer ones are broad enough to extend over the lateral margins, and all three attain the antenor margin of the dorsum; a few bristly hairs about the roots of the wings and much smaller ones on the dorsal stripes; sides a little more yellowish than the dorsum, with which latter the scutellum and metanotum are concolorous, the scutellum bearing a few stiff black hairs on the hind margin; the metanotum a little dusky in the centre. Abilomen dark blackish brown, with black pubescence; genital organis dark grey, with a little pubescence; venter similar to dorsal side of abdomen. Legs coxæ and femora yellowish; tibin dark brownish yellow, tarsi dark brown, front metataisi considerably widened; all the legs shortly pubescent, tibin with two rows of five or six long stiff hairs. Wings pale brown, stigma vague, very elongate, a little darker brown, halteres yellowish brown.

Length, nearly 4 mm.

Described from a single of in the Indian Museum taken by me at Darjiling, 29 v 1910, on the hillside.

# 297 Hilara peshawarensis, sp nov.

3 ♀ Whole insect blackish grey. Head: proboscis shining black, as long as height of head, with stiff hairs; antenne robust, microscopically grey pubescent, palpirather long, with moderately long bristly hairs Thorav with almost microscopic yellowish-grey tomentum, which is more conspicuous on hinder part and on scutellum, the latter with four long marginal bristles. Aldomen with the segments more or less microscopically grev-dusted (in good specimens), some grey pubescence with longer bristly hans on hind margins of segments; genitalia knob-like, rather large, concolorous, pubescent. Legs chestnut-brown, varying a little in colour, pubescent, fore metataisus in o' very large, oval, much larger proportionately than in H compacta; pubescence on front tibiæ becoming longer towards tip, knees yellowish; hind tibiæ in Q considerably, though not conspicuously, thickened except at Wings pale grey, indescent, stigmatic region brownish; stigma darker brown, elongate, with ill-defined edges.

Length, 3 mm

Described from a series of both sexes from Peshawar, N.W. India, 16. m 1913 (Howlett)

Type  $\sigma$  and Q sent to British Museum, cotype  $\sigma$  Q in Indian Museum and my collection.

# Genus HOWLETTIA, Brun.

Howlettia, Brunetti, Rec. Ind. Mus 1x, p. 23 (1913).

GENOTYPE, Howlettra flavrpes, Brun

A genus of anomalous position, allied to the EMPINE, OCYDROMINE, and TACHYDROMINE (Platypalpus).

Q. Head with eyes separated above by a moderately broad frons and only very narrowly separated below antennæ. Antennæ

of three distinct joints, first two short, subequal; 3rd shortly conical, with a long terminal arista. Proboscis about equal to height of head, perpendicular; palpi halt as long as proboscis or rather longer, quite broad. Thorax normally arched. Abdomen rather longer than thorax, somewhat compressed. Legs rather long and slender; fore coxe slightly longer than posterior pairs; middle femora somewhat incrassated; all tarsi longer than tibue. Wings with auxiliary vein faint and incomplete, 1st longitudinal vein lather further from costa than usual, ending beyond middle of wing; 2nd vein beginning at one-tourth of wing, ending towards tip of costa, 3rd vein beginning at middle of wing, anterior cross-vein just beyond origin of 3rd vein, which latter ends at about wing-tip, 4th vein nearly straight, ending just below wing-tip; 5th nearly straight; 6th (anal) very long, complete to wing-border. Posterior cross-vein meeting 4th vein at spot where auterior cross-vein meets it, but not in the same straight line; anal cross-vein nearly perpendicular to anal vein, 2nd basal cell slightly longer than 1st, apex pointed; anal cell barely half as long as 2nd basal, discal cell absent.

& unknown

Range Only the type-species known.

The genus is named after Mr F M. Howlett, of the Agricultural Research Institute at Pusa.

#### 298. Howlettia flavipes, Brun.

Howlettia flavipes, Brunetti, Rec Ind Mus. ix, p 23 (1913).

Q. Head blackish; proboses dark brown; palpi brownish yellow; ocellar triangle rather prominent. Thorax shiring black, with very short whitish pubescence towards margins of dorsum, sides of thorax and dorsum of scutellum slightly grey-dusted, a few weak preniar bristly hairs. Abdomen black, a little shiring; venter brownish yellow, with a little very short whitish pubescence. Legs brownish yellow, minutely pubescent, middle femora a little incrassated, with a row of very short bristles on underside; tarsi blackish. Wings clear, indescent, venation in accordance with generic description; halteres dull brownish yellow.

Longth, 21 mm.

Described from a single 2 in the Pusa collection, now sent to

the British Museum, from Mussoorie, ix. 1906 (Howlett).

This genus is left in the subfamily Empine for the present, but it is distinctly anomalous, and does not exactly fit into any subfamily. The distinctly though only moderately increasated middle femora suggest the Tagingmonium, from which the very distinct anal cell and complete anal vein combined separate it. The absence of the discal cell makes it abnormal in Empine. It has allimities with the Ocymponium in the less distinct anal angle of the wing, though it is by no means cuneiform, also in the anal cross-vein being perpendicular to the anal vein.

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# Subfamily OCYDROMIINÆ.

Head. eyes in male contiguous, in female contiguous or not, rarely narrowly separated in both sexes. Proboscis generally shorter than head, if long, projecting directly or obliquely forwards, palpi one-jointed. Antennæ 3-jointed, with terminal arista or 2-jointed style, which latter may be aristiform Thorax more or less humped; metapleura bare or with short hairs. Wings with axillary lobe well developed (except in Leptopeza), 3rd longitudinal vein simple; 4th simple or forked Discal cell present; three or four posterior cells; basal cells subequal, anal cell not longer than 2nd basal. Lower branch of 5th longitudinal vein meeting anal vein parallel with, perpendicular to, or at an angle of 45° to hind margin of wing, making anal cell truncate at tip or the anterior margin of it the longer, anal vein of varying length, squamæ very small or absent

This subfamily comprises smaller and more delicate species, often of pale colour, of which the short proboscis is a principal

feature

#### Genus LEPTOPEZA, Macy.

Lemtopeza, Macquart, Soc. Sci Lille, p. 143 (1827) (emind)
Genotype, Ocydronia flavipes, Mg. (Europe).

Head almost as broad as thorax; eyes occupying whole front of head, contiguous in both sexes, rarely otherwise; \* facets of umform size Antennæ 3-jointed, first two short, bustly, 3rd. though narrowed slightly at base, conical, bearing a long rather thickened bare arista joined to tip of 3rd by a minute joint. Epistome very narrow, the eyes reaching the mouth-opening, proboscis very short. Thorax rectangular, strongly arched, with minute discal bristles; on the margin generally a notopleural, postalar, and sometimes a supra-alar bristle, with other small bristles or bristly hairs, scutellum with two or more marginal bristles or stiff hairs; metapleura with short fine hairs. Abdomen slender, 8th segment small or hidden Genitalia in male with asymmetrical parts; in female forming a long, compressed, swordshaped ovipositor. Legs rather long and slender, hind pair longest: hind tibue sometimes slightly thickened towards apex; soft pubescence and various bristles on the legs. Wings with auxiliary vein abbreviated, not reaching margin; 3rd vein simple; anterior fork of upper branch of 4th vein indistinct or absent: lower branch of 5th vein strongly recurrent, parallel with hind margin of wing; anal vein shortened

Range. Europe, India, North Africa, Cape Horn, North

America, Australia.

Life-history unknown.

<sup>\*</sup> A narrow from above in at least one European species (ephenoptera), yet the eyes contiguous below antennæ.

# 299. Leptopeza vitripennis, Brun (Pl. IV, figs. 12, 13.)

Leptopeza vitripennis, Brunetti, Rec Ind Mus ix, p 31 (1913)

of Q. Head blackish, proboses horizontal, as long as length of head, shining black; palpi short, poirect, black; antennæ with elougate conical 3rd joint, arista long, black. Thorax very highly arched, shining black in middle of dorsum, with short whitish hairs laterally. Abdomen shining black, with short whitish pubescence, ventor similar. Legs rather pale pitch-brown, a little pubescent. Wings very clear and indescent; halteres black.

Length, 2 mm.

Described from a type of from Oncha Gaon, Naina Tal Distr, 1-6 v. 1907, and a type Q and a second Q from Rangoon, 24. 11. 1908 (Annandals)

Types in the Indian Museum.

# Subfamily HEMERODROMIINÆ.

Head with eyes separated in both sexes, from sometimes narrower in d, eyes sometimes contiguous below, when this is so, frontal facets larger than the others, eyes sometimes pubescent. Proboscis short, not longer than height of head, palpi 1- or (indistinctly) 2-jointed Antenna 3-jointed, with, in some genera, a 2-jointed style which may be aristiform; one or two exceptions occur Thorax longer than broad, but slightly arched, metapleura bare, with short hairs or a few bristles. Legs with fore coxe always lengthened, sometimes about as long as femora, always longer than posterior coxe. Fore temora often incressate and fore legs often raptorial. Wings cuneiform at base, the axillary lobe being greatly reduced or absent; 3rd longitudinal vein simple or forked; 4th vein forked, lower branch of 5th vein may be distinctly recurrent, or placed perpendicularly to hind margin of wing, or absent. Four posterior cells; discal cell present or absent; basal cells more or less subequal, anal cell fonger or shorter than 2nd basal cell, or absent, anal vein of varying length or absent; squame absent.

The cuneiform wings and much elongated fore coxe will easily distinguish members of this subfamily. Many of the yellowish

forms of Employ: belong to it.

# Table of Genera. 1. Third longitudinal vem forked ... 2 [p. 367. Third longitudinal vem simple ... Phyllodromia, Zett, 2. A cross-vem between 2nd and 3rd vems . Dolichocephala, Macq., No such cross-vein ... 3. [p. 370. 3. Discal cell absent ... Microdromia, Big., Discal cell present ... 4. [p. 366. 4. Proboseis thick, shorter than height of head ... Clinocera, Mg., p. 364.

#### Genus CLINOCERA, Mg.

Chnocera, Meigen, Illig Mag. 11, p 271 (1803) Hydrodroma, Macquart, Hist. Nat Dipt 11, p 658 (1835). Paramesia, Macquart (nec Steph. 1829), loc cit p 656 (1835)

Genotipe, Chnocera mgra, Mg

Head usually broader than long, nearly or quite as long as thorax, epistome more or less elongated downwards; eyes well separated in both sexes, shortly and densely pubescent, facets of uniform size. Proboses very short and thick, palpi 1-jointed or indistinctly 2-jointed, short, slightly clavate at tip Antennio inserted above middle of head, 3-jointed; 1st joint cup-shaped, 2nd subglobular, bristly, both short, 3rd onion-shaped, about as long as first two together, with a thick styliform pubescent arista articulated to tip of 3rd joint by a microscopic joint. Thorair a little longer than broad, nectangular, moderately anched. humeral (occasionally more than one), a post-humeral, one or two notoplemal, a supra-alar, and postalar bristles present; scutellim with two long apical bristles, rarely more, metapleura with some hairs. Abdomen elongate, slender, the complex male genitalia concealing the reduced 7th and 8th segments, in female abdoment more pointed. Legs long and slender, fore coxe not greatly elongated; front femora often thickened at base and with bristles below, legs shortly pubescent. Wings somewhat lengthened, auxiliary vein lather short but reaching margin, 1st longitudinal vein ending at about middle of wing; 2nd vein sometimes wavy in some species with a sudden loop downwards enclosing the stigma; 3id vein forked, discal cell present, varying in length, discal end pointed or truncate, lower branch of 5th vein strongly recurrent, parallel with hind margin of wing; anal cell with distal end bluntly pointed or rounded, anal vem abbreviated. Alula absent, alar squamula very small

Range Europe, Siberia, India, North America.

Lefe-listory unknown, probably aquatic in larval state.

This genus has a faces distinguishing it easily from other EMPIDE, and with some resemblance to some water-haunting Dolichopodide. The elongate body and proportionately longer legs, the pubescent eyes and rather long wings, the usually greyish colour with lighter parts, and the not infrequently spotted wings, give them a characteristic appearance. All are found in the neighbourhood of water, running streams, or stagmant pools, on the surface of which most species appear capable of running with ease.

The European species of Clinocera may be fairly satisfactorily grouped into several subgenera, mostly set up by Mik; but as only two species are yet known from the Orient, of which at least one (fluviatilis) comes in Clinocera, s. str., these subdivisions may be ignored here.

The two Indian species differ as follows:—

Blackish-grey thorax, dark brown abdomen, brownishyellow legs, length, 2 mm fluriatilis, Brun
obscuia, Brun

#### 300. Clinocera fluviatilis, Brun

Clinocera fluviatulus, Brunetti, Rec. Ind. Mus. 1x, p 34 (1913).

3. Head brownish grey, with isolated black bristles on the occiput and a few on the frons; frontal tubercle bearing two divergent bristles. Antennæ black; 1st and 2nd joints subequal, 3rd onion-shaped, with moderately long, nearly bare arista. Proboscis and palpi blackish, both short Thorax very dark brownish grey, nearly black, a whitish-grey stripe on the sides from just below the shoulder to as far as below the ends of the transverse

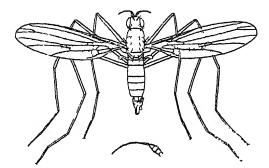


Fig. 33.— Clinoce a fluviatiles, Brun., and antenna.

suture, ventral part of thorax also whitish grey. Dorsum bearing several isolated bristles (many of these are broken off), of which one is present on the shoulder, and one towards, but not at the hinder corner; scutellum with two long bristles. Abdomen dark grey, normally pubescent. Genitalia large, consisting of a ventral dark grey plate, a large concave lower piece, and a pair of claspers above, these latter constituted of a large oval basal concolorous joint and an elongate brownish-yellow horny billd second joint: the whole of the genitalia a little pubescent. Legs long and slender, uniformly dark brownish grey, practically bare. Wings very pale grey. The 3rd longitudinal vein forked beyond threefourths of its length, the branches approximate to one another and parallel; anterior cross-vein before middle of discal cell, and at about one-third the length of the wing; branches of upper branch of 4th longitudinal vein issuing close together from discal cell, thence gradually diverging; the discal cell much longer on its anterior border than its posterior one; lower branch of 4th vein nearly straight, rather more strongly developed; 2nd basal cell short, lying against the middle third of the upper basal cell: 366 DMPIDÆ.

anal cell barely longer than 2nd basal; 6th ven very short. Halteres: stem yellow, clubs dark grey.

Length, 3 mm; wing, 4 mm

Described from a single specimen from Bhowali, Kumaon Distr., 12 vi 1910 (Imms), on stones on banks of stream.

A specimen which probably belongs to this species, but showing a discrepancy in the shape of the discal cell, is amongst the Diptera collected by Mr. Kemp on the Abor Expedition

#### 301. Clinocera obscura, Brun

Clinocei a obscura, Brunetti, Rec Ind Mus. ix, p 34 (1913).

J. Head blackish grey, some stiff hairs on occiput and from. which latter is very broad. Proboscis short, halt the height of the head, shining black, with a much swollen apical mit (this latter in one specimen partly brownish yellow); palpi very small. brownish yellow Antennal 3rd joint elongate oval, with long black arista. Thorax brownish grey, including scutellum, sides and metanotum bluish ash-grey, some dorso-central and lateral bristly hairs. Abdomen dark blown, softly pubescent. Genitalia extremely long and conspicuous, blackish, with a few pale hairs. egg-shaped, convex, bent under the venter, the narrower end pointing towards the base of the abdomen, posteriorly (, e from the broader end) project some yellowish filamentous appendages. Legs brownish yellow, coxe ash-grey, especially the posterior pairs, tarsi a little darker Fore femora with a few soft pale longer hairs; remainder of legs microscopically pubescent Wings very pale grey, wholly unmarked, highly iridescent, halteres brownish yellow.

Length, 2 mm

Described from two of in the Indian Museum from Simla, 10. v 1909 (Annandale).

# Genus MICRODROMIA, Big.

Microdiomya, Bigot, Ann. Soc. Ent. France, (3) v, p. 503 (1857) (emend.)

GENOTYPE, Tachydromia oratorio, Fln. (Europe).

This genus differs from Clinocera by the fore come being nearly as long as the femora, the latter being considerably thickened. Head elongate, ovate, eyes more elongate than in Clinocera and sometimes contiguous below the antennæ; arista unjointed; proboscis about as long as height of head. Thorax with the major bristles apparently variable, metapleura bare. Legs with fore come from rather shorter than to nearly as long as femora; fore femora much thickened, with two rows of short spines below, and a row of long bristles on each side; fore tibiæ curved at base, with a row of short spines on inner side and a long apical spine, posterior tibiæ without apical spur. Wings with subcostal vein short; no discal or anal cell, 3rd vein forked; lower branch

of 5th longitudinal vein absent or abortive, analvein generally absent; no stigma

Range. Europe, Siberia, India, Java, North America, Chile.

Life-Instory. The metamorphoses are known of practiona, Fln., a European species of Hemerodroma, of which Microdroma is generally regarded as a subgenus, and Brocher has described and figured them.\* The larva lives in mud in streamlets, the pupa being also aquatic.

The perfect insects frequent the borders of woods and lakes, or

humid places, generally on low herbage and in grass.

#### 302. Microdromia dorsalis, Brun.

Chelipoda dorsalis, Brunetti, Rec Ind Mus 1x, p. 33 (1913).

of Ω. Head blackish, proboscis pale vellowish, very stout at the base, the upper piece prolonged into a long haid shining rostrum; antennæ wholly pale yellowish white. Thorax brownish yellow, dorsum black or dark brown, the colour extending more or less over the sides, scutellum and metanotum concolorous with dorsum. Abdomen brownish vellow, the dorsum of each segment black, thus forming a continuous black stupe from base to tip, but the hind borders of some of the segments escape the black colour; venter brownish yellow Genitalia in & large, wholly black, rather complex, comprising at least a pair of claspers, which are stout at the base and with flexible finger-like appendages; also a long narrow ventral style. Legs very pale yellow, fore femora with a row of very short microscopic spines, fore tibic possessing two such rows; the fore femora also have a row of long stiff bristly hairs on the underside and two still longer ones below near the base. Wings clear, veins brown; halteres pale brownish yellow.

Length, 2 mm.

Described from three specimens in the Indian Museum, taken at the edge of a small stream at Barogh, Simla Hills, 5000 It., 10. v. 1910 (Annandale).

#### Genus PHYLLODROMIA, Zett

Phyllodromia, Zetterstedt, Isis, 1837, p. 31 Chiromantis, Rondani, Dipt. Ital. Prod. 1, p. 148 (1856). Thanmodromia, Mik, Wien. Ent. Zeitg, v, p. 278 (1886). Latanomyia, Melander, Trans. Amer. Ent. Soc. xxviii, p. 231 (1902).

Genorype uncertain.t

Head rather elongate and flattened, broader than thorax, eyes large, elongate, separated in both sexes, subcontiguous below

\* Ann. de Biologie Lacustre, iv, p 44, figs 1, 2 (1909)

<sup>†</sup> There seems some obscurity as to the genotypes of Chelipoda and Phyllodronna, which it is impossible to clear up here owing to the "Mom Son Sci. Lille" not being available in India. Rondani in 1856 selected Empis melanocephala, F., as type of Phyllodromia, the same species which Coquillett chose as type of Chelipoda in 1910.

antennæ, with facets of uniform size; proboscis short, thick, vertical, palpi one-jointed. Antennæ inserted a little below the middle, 3-jointed, basal joints short; 3rd elongate, pointed, with long terminal arista, attached by means of a minute joint. Thorax rectangular, moderately arched; prothorax forming a short neck A few uniserial dorso-central bristles; a notopleural and supra-alar bristle present; scutellum with two bristles, metapleura with a few bristles. Abdomen with last two segments in male reduced, hidden by the genitalia, which latter are rather large; abdomen in temale more pointed, genitalia normal. Legs as in Chelipoda; fore coxæ nearly as long as fore femora. Wings in venation and shape as in Chelipoda; discal cell present; anal angle not developed.

Range. Europe, India, N. America, Argentina.

Life-history unknown. The images frequent grass and damp meadows.

Phyllodromia, Zett, differs from Chelipoda, Macq., practically only in the presence of the discal cell, and is ranked as a subgenus of the latter in the Kertész Catalogue, but if the character is constant one way or the other in all the species, there seems no reason why both should not be admitted to generic rank. My flavida was placed in Chelipoda on the broader view of the genus, but must now be transferred to Phyllodromia, with my indica, the latter having been described under Litanomyia, which is now considered synonymous with Zetterstedt's genus.

P. flavida differs from indica by the thorax being mainly

brownish yellow as opposed to blackish grey

# 303. Phyllodromia flavida, Bi un (Pl. IV, figs. 14, 15.) Chehpoda flavida, Brunetti, Rec. Ind. Mus. 1x, p. 32 (1913).

3 Q. Head yellowish; three ocelli on the black vertical triangle. which also carries two divaricate long bristles: from moderately broad, occuput with four long curved bristles placed equidistantly, seen from behind, the occiput has a greyish tinge, as has sometimes the frons also, eyes black, rounded, almost contiguous immediately below the antennæ for a short space, the face broadening below, the latter, seen from above, appears silvery white. proboscis very short, half the height of the head, conical, sharply pointed, yellowish, the upper part (hypopharyux) narrou, hard, shining First two antennal joints yellowish, with some short bristles at the tips of each; 3rd joint dark brown, elongato onion-shaped, with long brown microscopically pubescent aristu. Thorax very variable, generally brownish yellow, with more or less blackish colour, either in the form of a dorsal stripe, a lateral irregular and somewhat indistinct border, or the posterior part of the dorsum more or less blackish, sides generally lighter, in some specimens attaining a pinkish-fawn colour. Abdomen variable, brownish yellow, more or less blackish in part or wholly; venter brownish

yellow, genitalia small, concolorous. Tip of abdomen in of stump-like; in Q tapering, the two terminal lamellæ pale yellowish. Legs yellowish or pale yellow; front coxæ narrow, cylindrical, nearly as long as the femora, the latter slightly brownish at tips and considerably incressated, with two yellow

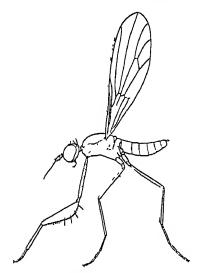


Fig. 34 -Phyllodromia flavida, Brun.

bristles near the base on the underside and a row there also of microscopic spines; posterior come and femora of normal size, the former a little brownish, as are also the tips of the tarsi. Wings very pale grey, veins black; halteres brownish yellow.

Length, 2 mm.

Described from several specimens in the Indian Museum from Paresnath, 4000-4300 ft., Chota Nagpur, 9-13. iv. 1909 (Annandale), including type & (9. iv. 1909); Dawna Hills, 2000-3000 ft., 2. iii. 1908, type & (Annandale), Darjiling, 28 v. 1909 (Brunetti).

The Parennth specimens were taken on stones, where they were in considerable numbers hidden in undergrowth at the edge of a spring.

# 304. Phyllodromia indica, Brun. (Pl. IV, figs. 16-18.)

Litanomyia indica, Brunetti, Rec. Ind. Mus. ix, p 36 (1918).

3. Head black; antennæ large, the 1st and 2nd joints yellowish; 3rd black, oblongo-conical, cup-shaped at bottom, and furnished with a long arista; face whitish grey; occiput and underside of head dark grey, the lower part of head projecting forward somewhat; proboscis short, pointed, and slightly curved. Thoraw nearly as long as abdomen, oblongo-ovate, blackish grey, moderately shining. Three conspicuous bristles towards each side,

one on the shoulder, one towards the hind corner of the dorsum, and one about equidistantly between these two, this middle pair being rather closer to each other (that is, to the middle line of the thorax) than the others are, yet still a considerable distance apart; there is also one on the side of the thorax, in front of the wing; scutellum with two bristles. Abdomen dark brown, almost devoid of pubescence. Legs wholly pale yellow, fore femora much enlarged, fore coxe and fore tibue each very slightly longer than the fore femora, the latter being spiny and bristly below, hind tibue very slightly enlarged, at the tip only Wings very pale grey, a little yellowish towards base and costa, unmarked.

Length, 2 mm

Described from one 2 in the Indian Museum taken by me at Darjiling, 7000 ft., 29. v. 1910, on the hillside, in mixed herbage.

#### Genus DOLICHOCEPHALA, Macq.

Dolichocephala, Macquart, Soc. Sci. Lille, p. 147 (1823) Ardoptera, Macquart, op. cit. p. 105 (1827). Leptosceles, Haliday, Ent. Month. Mag. 1, p. 160 (1833).

GENOTYPE, Tachydromia irrorata, Fln. (as maculata, Macq) (Europe).

Head with epistome produced downwards, pointed; eyes rather large, somewhat elongate, widely separated in both sexes, with dense short pubescence; proboscis short, thick; palpi 1-jointed. Antennæ 3-jointed, placed just above middle of head, all the joints short and minutely pubescent, 2nd with bristles, 3rd rounded, somewhat disciform, with long, curved, rather thickened arista, which possesses a minute ring-like basal joint Thoran rather elongate, with rounded anterior angles, moderately arched. Uniserial dorso-central bristles, a humeral, post-humeral, notopleural, and postalar bristle present, and two scutellar bristles, metapleura bare. Abdomen 8-segmented; the two anal segments reduced and partly concealed by the male genitalia; abdomen in female pointed. Leas slender; fore coxe slightly elongated, about half as long as femora. Legs minutely pubescent, tibio without spurs; two pulvilli and a small linear bristle-bearing empodium with auxiliary and 1st longitudinal veins short, the former reaching the margin; 2nd vein long; 3rd vein forked, the upper branch united to 2nd vein towards its tip; lower branch of 5th vem strongly recurrent, almost immediately meeting anal vein (which is very abbreviated, not nearly reaching wing-margin). making anal cell very short and truncate. Dorsal cell very clongate, 2nd basal cell very short, much shorter than 1st basal and subequal to anal cell, three submarginal, four posterior cells; hind angle of wing quite reduced, making it almost cuneiform. Groundcolour of wing brown, with hyaline spots.

Range. Europe, India, North America.

A limited genus of small delicate Empids, easily recognised by the brown wings with pale spots. 305 Dolichocephala septemnotata, Brun. (Pl IV, figs. 19-21.)
Dolichocephala septemnotata, Brunetti, Rec. Ind. Mus 18, p. 35 (1913).

d. Head blackish, from broad, some stiff hairs on both from and occiput, epistome (the whole of the head below the eyes) conical, short, half the height of the rest of the head Antenna black, 3rd joint conical, with long black thick arista, microscopically pubescent; no palpi apparent. Thorax and abdomen wholly black, moderately shining, practically bare, except for a few stiff hairs laterally on the former; genitalia small, rounded, simple Legs pale yellowish, upper side of fore femora and tips of tarsi a little brownish. Wings very pale brown, with seven very distinct moderate-sized circular pale spots, six of these are placed in two parallel rows of three in each, the upper row just above the 3rd longitudinal vein, the lower low a little above the hind margin of the wing, so that the spots appear like three pairs situated longitudinally; the 1st pair (1. c the basal spots of both rows) is situated a little before the middle of the wing, the 2nd pair a little beyond the middle, the 3rd pair half-way between the 2nd pair and the wing-tip, the upper spot being in the middle of the submarginal cell, of the spots in the longer low, the first is placed a little before, the second a little beyond the lower branch of the 5th longitudinal vein, the third is in the middle of the 2nd posterior cell; the seventh spot is near the wing-tip, at the end of the 1st posterior cell; the 3rd, 4th, and 5th longitudinal veins are all wavy, the 3rd is forked at two-thirds the length of the wing, the submarginal cell narrowed in the middle, with the marginal cross-vein just beyond the cell's base, uniting it to the 2nd longitudinal vein just before its tip, the 4th longitudinal vein, although wavy, is mainly in a straight line, and divides the wing into nearly equal parts, ending just below the wing-tip; anterior cross-vein very near base of wing; posterior cross-vem at middle of wing, joining the upper branch of the widely-forked 5th vein soon after the furcation; and cell oblong, very short; halteres brownish yellow.

Length, 1½ mm.

Described from one of in the Indian Museum from Simla, 10. v. 1909 (Annualdae).

#### Genus TRICHOPEZA, Rond.

Tricopeza, Rondani, Dipt Ital. Prod. 1, p. 150 (1856) (emend.).

Genotype, Brachystoma longicornis, Mg. (Europe); by original designation.

Head a little broader than long, slightly broader than thorax; eyes occupying whole front of head, shortly pubescent, separated above antenne in both sexes, contiguous below for some distance, frontal facets in both sexes enlarged. Proboscis thin, nearly

as long as head, directed downwards; palpi 1-jointed, long, clavate, with long hairs. Antennæ placed above middle line of head, 3-jointed, 1st elongate, cylindrical, compressed at base; 2nd subglobular, 3rd three times as long as first two together, suddenly narrowing before one-fourth of its length and thence gradually tapening to a point; no style or arista.\* Thorax rectangular, considerably arched. Some weak dorso-central bustles, a humeral, post-humeral, larger and smaller notopleural, supra-alar and postalar bristles present; scutellum with two bristles; metapleura bare Abdomen rather long and slender. 8-segmented; the 7th and 8th segments in the male reduced. covered by the genitalia, which latter are complex, somewhat resembling those of Hilara Abdomen in female rather thick at apex, with only six obvious segments, the 7th being peculiarly enlarged and the 8th concealed; ovipositor small Legs long and slender, fore cove only slightly elongated, fore femora slightly thickened, with bristles below; posterior tibio with long bristles and small apical spurs. Wings with auxiliary vein not reaching margin, 3rd vein forked; discal cell present; lower branch of 5th vein recurrent, parallel with hind margin of

Range. Besides my fusca the only other known species is

longicornis, Mg., of Europe.

Life-history unknown.

# 306. Trichopeza fusca, Brun.

Trichopeza fusca, Brunetti, Rec Ind. Mus ix, p 31 (1913).

Q. Head blackish, eyes subcontiguous. Antenno with very long cylindrical 1st joint, short large subglobular 2nd joint, and very elongate conical 3rd joint, which has a very long thick curved minutely pubescent style. Thorax dark brown, lighter at the sides; scutellum and metanotum concolorous with dorsum. Abdomen dark brown, but a little lighter than the thorax; very sparsely pubescent, genitalia inconspicuous; venter brownish Legs long and slender, uniformly pale yellowish, except the blackish tarsi. Fore coxe twice as long as the others, but one-third the length of the fore femora; all the femora approximately equal in length, tibiæ very little shorter than femora, hind pair a little incrassated at the tips; tarsi about as long as tibie, blackish. All the femora possess a few isolated long stiff hairs on the underside, and the middle femora have one on the front side near the tip; all the tibie with one such stiff hair on outer side a little before the first third of the length, and a few shorter ones on hinder side of middle tibie, also a single one

<sup>\*</sup> Lundbeck describes the 3rd joint as tapering into an arista, stating that a microscope fails to show any articulation. In such a case a simple joint only must be recognised.

on hinder side of hind tibue at about one-third of the length. Wings very pale grey, very midescent; 3rd longitudinal vein widely forked beyond half its length; prongs of upper branch of 4th vein issuing wide apart from the discal cell, the latter being

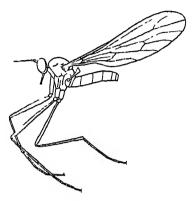


Fig. 35 .-- Trichopeza fusca, Brun.

large, long, pointed basally, about equal in length to 2nd posterior cell; 1st basal cell a little longer than 2nd, which latter is about as long as anal cell; halteres yellow.

Length, 3 mm; wing, 43 mm.

Described from a unique Q in the Indian Museum from Kurseong, 25. iii. 1910 (Gravely)

The peculiar nature of the antennæ ought easily to distinguish this species from all other Indian Empire.

# Subfamily TACHYDROMIINÆ.

Head with eyes more variable than in the other subfamilies, generally separated above the antenne in both sexes; below they may be contiguous or separated; when contiguous below, the frontal facets may or may not be larger than the others; in some genera the eyes incroscopically pubescent. Proboscis short, sometimes curved; palpi 1-jointed. Antenne 3-jointed, with a styliform arista of one or two joints. Thorax often nearly as broad as long; metapleura bare, or with very short hairs. Legs of varying lengths; sometimes the fore femora or four anterior femora thickened, in which case the four anterior legs are raptorial; middle tibic sometimes with a spine. Wings with axillary lobe more or less developed; 3rd and 4th longitudinal veins simple; three posterior cells; no discal cell; lower branch of 5th vein present or absent; basal cells rather large, subequal

or the 2nd the longer; anal cell normally absent, when present shorter than basal cells and anal vem weak, usually accompanied by the character of incressated middle femora, anal vein weak or

absent, squame absent

This subfamily is distinguished by the (normal) absence of the anal vein, or, when it is present, by the thickened middle femora. Some genera with shortened abdomens and thick-set bodies are included here. Many species are of yellow or brown shades of colour.

#### Table of Genera

1. Anal cell absent Anal cell normally present, sometimes feeble [p. 374. TACHYDROMIA, Mg. or incomplete 2. A portion of the lower branch of the 5th longitudinal vein present, anal (6th) vein [p 378. TACHYPEZA, Mg, Lower branch of 5th vein, also anal vein, entirely absent. 3. Legs short and robust, abdomen short and broad, 3rd antennal joint short, ovate DRAPETIS, Mg., p. 380. Legs slender, abdomen more elongate, relatively less broad, 3rd antennal joint [р. 384. Екариворека, Масс., elongate, conical .. ... ..

#### Genus TACHYDROMIA, Mg.

Tachydromia, Meigen, Illig Mag. 11, p. 269 (1803). Sicus, Latreille (neo Scop. 1763), Précis Caract Gen. Ins. xiv, p. 158 (1796).Phorozypha, Rondani, Dipt Ital Prod. 1, p. 146 (1856). Platypalpus, Macquart, Soc Sci. Lille, p. 92 (1827). Bi evios, Brunetti, Rec Ind. Mus 1x, p. 22 (1913)

Genotipe, Tachydromia conneva, Mg. (as cimicoides, F) (Europe), by designation of Coquillett (1903).

Head rounded, as broad as thorax or nearly so, a little higher than broad; eyes rather elongate, separated in both sexes by a rather narrow frons, subcontiguous below antenna, facets of uniform size. Proboscis short, vertical; palpi 1-jointed, of variable size. Antennæ inserted about middle of head, 3-jointed; 1st very short, subcylindrical; 2nd somewhat rounded, bristly towards tip, 3rd considerably elongate, sometimes more than twice as long as first two together, approximately conical, slightly compressed at about the middle, with very long, microscopically pubescent arista, which possesses a minute basal joint. Thorax rectangular, moderately arched. No definite discal bristles, but the hairs on the disc may be more or less arranged into dorsocentral and acrostichal rows; one to three notopleural bristles and one postalar; generally a humeral, sometimes a post-humeral bristle, two or four scutellar bristles; metapleura bare. Abdomen in male cylindrical, tip bluntly pointed in female, male genitalia large, knob-like, hiding 8th segment. Legs anterior pairs

raptorial, fore coxe slightly longer than posterior ones; fore femora more or less thickened, with two rows of fine bristles below, middle femora considerably incressate, with two rows of short thick spines below, middle tibiæ often with an apical spine on inner side and a row of black spines below. Other variations occur in the legs in the shape of additional spines or bristles, and in the degree of incrassation of the femora. Two pulvilli, empodium small, linear Wings with auxiliary vein united to 1st longitudinal till near tip, reaching margin; 1st, 2nd, and 3rd (which is simple) normal; 4th simple; lower branch of 5th almost or quite recuirent, meeting the indistinct and incomplete anal vein at about a right angle. Discal cell absent, both basal cells long, subequal; anal cell incomplete through the wanting basal portion of the anal vem, 1st posterior cell often broadened in middle and distinctly narrowed at tip, axillary lobe of wing not conspicuous.

Range Europe, India, Tibet, China, Papua, North Africa,

North America, Chile, Argentina.

Life-history. Beling has recorded the metamorphoses of a European species T. (Platypalpus) major, Zett,\* which was

breeding on the ground under moss in a wood.

Tachydromia is a genus with a rather easily recognised facies, due to the thickened femora, long antenias, absence of discal cell in conjunction with the shape of the 1st posterior cell, and incomplete or absent and cell. The species occur in woods and fields, running swiftly over low herbage in search of prey; they are very carnivorous and rapacious, iemains of soft Diptera being often retained by their middle legs after death. Many species are conspicuous amongst Empire by their yellow colour.

	Table of Species.	
1.	Wings unmarked	2. [p. 375.
	Wings with two broad blackish bands	lutifasoipennis, Brun,
2.	Thorax bright ferruginous	3.
	Thorax black or blackish	4.
Q	Antennal basal joints yellow; thorax with	-
U	distinct median stripe, proboscis as long	Γ <sub>D</sub> 978
	distinct incomin stripe, proposes as long	[p. 976. ferruginea, Brun.,
	as height of head	Terruginea, 15rui.,
	Antenno all black, thorax without a median	
	stripe, but with two abbreviated lateral	
	ones, proboscis shorter than height of	[p. 877.
	head	nepalensis, nom nov,
4	Proboscis as long as height of head	gentilis, Brun., p. 877.
4.	Tronoscia an long as noight of nead.	orientalis, Brun., p. 378.
	Proboscis half as long as height of head .	orientans, mun., p. 576.

#### 307. Tachydromia latifasoipennis, Brun.

Tachydromia latifascipennis, Brunotti, Rec. Ind. Mus. xiii, p. 81 (1917).

5 9. Head shining black, bare; eyes separated above by a moderately broad from of uniform width, contiguous on under-

<sup>\*</sup> Verh. zool.-bot. Ges. Wien, xxxviii, p. 2 (1888).

side: antennal 1st joint moderately long, of usual shape, 2nd shortly conical, with long apical bristle, both joints brownish yellow; proboscis dark brown, palpi rather elongate, with long whitish-grey pubescence and a long apical black bristle, occuput grey; a pair of bristles behind vertex, a few shorter ones on back of head. Thorax elongate, as broad as abdomen, humer not constricted from mesonotum; wholly shining black, baie; scutellum and pleuræ black, a distinct pre-alar bristle. Abdomen black, moderately shining, nearly bare, male genitalia large; abdomen of 2 tapering, ovipositor normal. Legs black; fore coxe distinctly but not greatly enlarged, sometimes with a pale spot on outer side, fore femora grently increasated, in some specimens with basal part brownish yellow, in others with two pale spots on outer side, near base; in some the whole femur blackish brown, about basal half of all metatarsi yellowish. Wings grey, with two broad blackish bands, occupying greater part of wing, extending from costa to hind margin, leaving middle part of wing rather narrowly clear, and a moderately wide clear wing-tip and base; the blackish bands darker anteriorly.

Length,  $2\frac{1}{4}-2\frac{1}{2}$  mm.

Described from a few of each sex in the Indian Museum: Darpling, 8-11. viii 1909, including type of (J. I. Jenkins), and type Q, 8. viii. 1909 (Paiva), Dharampur, Simla, 5000 ft., iv.-v.

1908, Simla, 7000 ft., 11 v 1908 (both Annandale).

If Platypalpus can be regarded as distinct from Tachydromia, which seems doubtful, the three species of mine—orientalis, gentilis, and ferrugineus—will belong to it, as described, but my P pullulitibia and P. incisa belong to Tachypeza, the anal cross-vein being distinctly present in the former and a part of it in the latter.

# 308. Tachydromia ferruginea, Brun.

Platypalpus fer rugineus, Brunetti, Rec. Ind. Mus. 1x, p. 40 (1913).

Q. Head rather dark brownish yellow; proportions, pulcescence and bristles as in orientalis and gentilis, face blackish; antennæ with first two joints yellow, the 3rd blackish; proboscis as long as height of head, blackish; palpi short, rather thick, pale Thorax rather bright ferruginous brown, shining, with a moderately broad black median dorsal stripe, beginning on the anterior margin, and a much shorter one on each side of it. these two not attaining either the anterior or posterior margin. Short sparse pale yellowish hairs over the dorsuin and sides, most conspicuous just below the shoulders, two strong pre-alar bristles on each side, and one towards the posterior corner of the dorsum. Scutellum shining black, with very minute pale yellowish hairs and two long apical converging spines. Metanotum black, shining, with minute pale yellow hairs; sides of thorax black. Abilomen black, a little shining, almost bare; venter similar; genitalia pale yellowish, elongate. Legs bright yellow; fore femora a little

thickened; middle femora considerably thickened and with two rows of very small black spines and also a row of long stiff hairs, all placed on the underside, the middle tibus have a short but distinct spur-like tooth at the tip and a single row of minute black spines on the underside. Wings pale yellowish grey, veins a deeper yellow, surface of wing with short hairs and also microscopically setulose, halteres yellowish.

Length, 2 mm.

Described from a single Q in the Indian Museum from Kurseong, 4 vii. 1908 (Annandale).

## 309. Tachydromia nepalensis, nom. nov (Pl IV, fig. 22.)

Bievios longicornis, Brunetti, Rec. Ind. Mus. 13, p. 22 (1913).

d Head occiput blackish grey, with pale yellowish-grey pubescence, eyes closely contiguous, antennæ blackish, 3rd joint and its style with rather dense whitish pubescence, proboscis shorter than height of head, yellowish Thorax bright ferruginous, also scutellum and metanotum; a short black streak above each wing apparently joined together near posterior margin by an irregular blackish mark (thorax slightly damaged in this spot



Fig 36 - Tachydromia nepalensis, Brun, wing.

by the pin); sides grey. Abdomen black, roughened, nearly bare; genitalia lather large, black. Legs all wholly pale brownish yellow, with soft pubescence; middle femora slightly thickened. Wings pale grey, highly indescent; a slight obliteration of the veins at tips of basal cells; venation in accordance with the generic diagnosis; halteres brownish yellow.

Length, 2 mm

Described from a single 3 in the Indian Museum from Sarath, Nopal, 24. ii. 1908.

The present species, being now referred to this genus, has to be renamed, on account of the European species T. longicornis, Mg.

#### 310. Tachydromia gentilis, Brun.

Platypalpus gentilis, Brunetti, Rec Ind. Mus. i'r, p 40 (1913).

Q. Head wholly blackish, antenum and proboscis dull brownish yellow, the latter when fully protruded about as long as the height of the head, yellow at the base, black-tipped, palpi about half as long as the proboscis, stoutly cylindrical, pale yellow, with a few hairs. Thoraw shining black, with sparse yellow hairs and a few lateral bristles; sides a little grey-dusted, as is incre or

less the metanotum; scutellum shining black, with four yellow bristles. Abdomen black, moderately shining, shortly conical, almost bare; genitalia elongate, venter much as upper side. Legs pale brownish yellow, femora and tips of tarsi barely darker, the middle femora incrassated, and armed below as in orientalis. Wings clear; halteres yellowish.

Length, 21 mm

Described from four Q Q in the Indian Museum taken by me at Darpling, 26-29. v. 1910 (type, 28. v. 10); and one from Simila, 10. v. 1909 (Annandale)

#### 311. Tachydromia orientalis, Brun.

Platypalpus or centalis, Brunetti, Rec. Ind Mus. 1x, p. 39 (1913).

2. Head: occiput and from covered with close pule yellowishgrey tomentum, from with almost parallel sides; ocelli placed just below the vertex, with two proclinate bristles between them and with two similar bristles just behind the vertex, each of the latter placed in a minute black spot on the surface, two rows of distinct yellow hairs behind the eyes, below the vertical margin, and some on the lower part of the back of the head, antonnal basal joints bright reddish yellow, 3rd joint darker brown, clongate onion-shaped, with normally formed arista; face grey, with pale grey hairs, which give it a whitish reflection when viewed from certain directions, proboscis about half the height of the head, shining black, elongate conical, bare; palpi nearly half as long as proboscis, yellow, of moderate size, cylindrical, with a few hairs. Thorax with close very short yellowish-grey or concreous tomontum, and some lateral bristles, scutellum concolorous, with two strong apical converging bristles, and a smaller pair outside of these; metanotum concolorous, or in some examples more blackish grev. Abdomen dark mahogany brown or blackish brown, with a little short pale pubescence, a little broader on the middle segments, the apical half conical; the genitalia elongate, dark grey, venter similar to upper side. Legs bright brownish yollow; temora, especially posterior pairs, darker, or with a tinge of brown; tips of joints of tarsi also narrowly brown. Wings pule but distinctly yellow, veins a little deeper yellow; hulteres yellowish.

Length, 3-4 mm.

Described from several Q Q in the Indian Museum taken by me at Darpling, 7000 ft, 29.v. 1910.

# Genus TACHYPEZA, My.

Tuchypeza, Meigen, Syst. Besch. vii, p. 94 (1838).

GENOTYPE, Tachydromia nubila, Mg. (Europe); by Rondani's designation.

This genus is closely allied to Tachydromia, Mg. The eyes are contiguous below the antennæ, the facets in that region being a

little enlarged in both seves, occilar bristles absent; antennal arista unjointed; proboscis shorter than height of head. Scutellum with two bristles. Legs long and slender, the fore pair the shortest, the hind pair the longest; fore coxe slightly elongated; fore femora thickened in both seves, the middle femora slightly thickened, fore tibes sometimes somewhat thickened, more so in the male; tarsi long. Wings with venation as in Tachydromia, except that the anal cell is absent, lower branch of 5th vein present.

Range Europe, India, Siberia, North America, Jamaica.

Life-history unknown.

The flies are found on tree-trunks, and running swiftly over low plants and bushes. They are raptorial and are said to be loth to fly

Only two Indian species are known, distinguished as follows:—

Antenno all black , length  $1\frac{1}{2}$  mm . . . . . . . . . . palludtibæ, Brun. Antenno with basal joints pale , length  $2\frac{1}{2}$  mm . . . . . . . . . . . ucisa, Brun

#### 312 Tachypeza palliditibiæ, Brun.

Platypalpus palliditibiæ, Brunetti, Rec Ind. Mus. 1x, p 41 (1913).

3. Head blackish, frons and occiput with microscopic whitish hairs, some also on underside of head, antennæ black; proboscis mainly black, not so long as height of head, palpi nearly white, half as long as the proboscis. Thorax wholly blackish, with microscopic pale yellowish hairs; scutellum, metanotum, and sides all similar; bristles distributed as in the three previous species. Abdomen black, with sparse pale hairs, tip stump-like; genitalia of moderate size, rounded exteriorly, mainly withdrawn; venter like upper side Legs yellowish; femora mainly blackish, as are the tarsi-tips. Wings clear, halteres: stem black, clubs whitish. Length, 1½ mm.

Described from one of in the Indian Museum from Simla, 11.v.1908 (Annandule).

# 313. Tachypeza incisa, Brun.

Platypalpus incisus, Brunetti, Rec. Ind. Mus. ix, p. 41 (1913).

G. Head blackish, occiput with short whitish-grey hairs, from moderately narrow, widened a little in the middle, at which place are situated the three limpid occili in the form of a triangle. Proboscis brownish yellow, half the height of the head; palpi pale yellow, with a few black bristles. Antennæ large, 2nd joint yellowish, with a row of short subapical bristles; 3rd dark brown, with minute pale pubescence, squarish or nearly V-shaped at tip, with a long thick arists from the upper angle at the tip. Thorax wholly shining black, bare, except for microscopic yellow hairs and two or three notopleural bristles; scutellum with two apical

bristles. Abdomen black, moderately shining, practically bare; venter similar. Genitalia rather large, black, a pair of claspers with large basal joint with long crooked terminal black hook-like appendages. Legs brownish yellow, fore come half as long as the femora; anterior femora incrassated, hind femora not thickened, long, tarsi more or less brown, all the legs minutely pubescent. Wings microscopically setulose, pale brown, no stigma; venation normal, anal cell absent, the anal cross-vein present but incomplete.

Length, 2½ mm.
Described from a single of in the Indian Museum from Simla,
20 vn 1911 (Annandale).

#### Genus DRAPETIS, Mg.

Diapetis, Meigen, Syst. Besch in, p 91 (1822) Ciossopalnis, Bigot, Ann Soc Ent France, (3) v, p 563 (1857).

GENOTYPE, Drapetis exilis, Mg (Europe).

Head not so broad as thorax, but broader than high, rather short; eyes microscopically pubescent, separated in both serves, sometimes narrowly just above antenno, below which they are contiguous or nearly so, facets of uniform size. Proboses short, vertical, palpi one-jointed. Antenno inserted just above the middle, very short,\* especially 1st joint, 2nd joint slightly broader at tip, bristly; 3rd conical, varying in length but always comparatively short, pointed, with a rather long apreal arisia, which is said to possess a microscopic basal joint. Thorace approximately square, with rounded corners, generally moderately arched, in some species more so, dorsum with fine pubescence. Chætotaxy apparently slightly variable, generally some dorsocentral, accostichal, and notopleural bristles, with often a postular and post-humeral bristle, scutellum with two bristles; metapleura practically or quite bare. Abdomen short and robust, 8-segmented, ending in male in a knob-like genital organ, in female in a point Legs comparatively short and strong, fore and hind femora rather thickened, hind tibie sometimes ending in a projecting tooth, Legs shortly pubescent, with a few bristles; tibic spurred or not.+ hind pair with a small bump at tip; empodium very small, seti form. Wings short, rounded, and angle well developed; auxiliary vem inconspicuous, short, ending free; 1st, 2nd, and 3rd longitudinal veins slightly curved forward; 3rd, 4th, and 5th veins simple, a trace of an anal vein, but indistinct or unappreciable at base. Discal cell absent; 2nd basal cell much longer than 1st, truncate, anal cell absent.

<sup>\*</sup> Melander describes the antenna of this and some kindred genera as two-jointed. The lat joint is often so small as to be overlooked, or it may conceivably be reduced to a mere facial protuberance.

† Schiner says that the front tibia are spurred.

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Range. Europe, India, Burma, Java, North Africa, North America, St Vincent, Chile, Australia.

Life-history unknown

Drapetis is conspicuous amongst Empids on account of its short thick-set body, short robust legs, and the curved 1st, 2nd, and 3rd veins, in conjunction with the absence of the discal and anal cells. The flies frequent fields and meadows in preference to woods, running swiftly over the leaves. Lundbeck thinks some species hibernate in the imago stage

One or two subgenera have been set up on, I think, rather weak or inconstant characters, and all the species are here

retained under the one generic heading.

# Table of Species.

1 Abdomen partly gellowish ... Abdomen wholly black 3. 2 First and last thirds of abdomen yellowish, middle third black varregata, Brun., p 381 Abdomen dirty yellow, darker posteriorly discordalis, Bezzi, p 382 3 (a) Third antennal joint trapezoidal, all femora broadly black from base .... brewer, Brun., p 382. (b) Third antennal joint onion-shaped, all [p 383 femora with black streak above ..... fascifemorata, Brun., (c) Third antennal joint nearly round, only hind femora with black streak on middle [p. 383. of upper side notundicornis, Brun, (d). Third antennal joint obcouncal, legs all yellow except for brown tarsi-tips ... ruftpes, Brun , p. 383.

# 314 Drapetis variegata, Brun.

Drapetis varuegata, Brunetti, Rec. Ind. Mus. 1x, p. 39 (1913).

Q. Head: occiput and from shining black; eyes as in brevior. First two joints of the antenne dark brown, 3rd black, very elongate conical, with long apical arista. Proboscis short, brownish yellow, with yellow hairs. Thorax dark shining brown on anterior part, with three black, not very obvious stripes (with, however, linear edges), all of which begin on the anterior margin; posterior half of thorax more or less blackish. Scutellum yellowish, with blackish dorsum and two long curved apical bristles; metanotium shining brown. Abdomen with very sparse pale yellow hairs; basal third (except the extremely narrow black actual base) yellowish; middle third blackish; apical third yellowish or brownish yellow; venter yellowish (in one example somewhat blackish across the middle). Legs wholly bright yellow; coxe brown, tarsi hardly, if at all, darker. Wings pale yellowish grey, indescent; veius and halteres yellowish.

Length, 21 mm.

Described from two Q (not  $\sigma$   $\sigma$ , as originally stated) from Rangoon, 25. 11. 1908 (Annandale).

#### 315. Drapetis discoidalis, Bezzi

Ctenodi apetis discordalis, Bezzi, Ann. Mus Hung 11, p 355 (1904).

2. Near D gracilis, Bezzi. Head elongate, rounded, black; eyes contiguous, antennæ short, yellowish white, anista rather long; proboscis elongate, yellow; palpi white. Ocelli and vertical bristles long. Thorac moderately arched, yellow, moderately shining, middle of dorsum black, humeral cally broadly yellow, leaving a median black line attaining anterior margin; short pubescence absent, acrostichal and dorso-central bristles long, projecting anteriorly, presutural and alar ones long. Scutellum shining black, two bristles, halteres yellow, clubs Abdomen a little longer than thorax, dirty yellow, darkened above posteriorly, ovipositor rather long, conical, black, with pale short pubescence Legs bright yellow, long, slender. posterior tibie with two bristles placed respectively on first and second thirds, at tip with a short obscure callus. Wings long, hyaline, narrowly cuneiform at base, 4th vein quito straight, a little curved towards 3rd; anterior and posterior wing-margins with dense short hairs.

Length, 2 mm, wing, 22 mm

One female from Matheran, Bombay, 800 metres, 8. vn. 1902. Type in the Hungarian Museum.

#### 316. Drapetis brevior, Brun (Pl. IV, figs. 23, 24)

Diapetis bienor, Brunetti, Rec Ind. Mus 14, p 37 (1913)

Q. Head very dark grey, eyes contiguous for a considerable distance, rounded, vertical triangle dark grey, with three occili and two strong long proclinate bristles, two equally long ones behind the eyes, curved towards each other, with also some smaller ones; antenna with first two joints dark brownish yellow, the 3rd black, as long as the 1st and 2nd taken together, with a very long black apical arista, inicroscopically setulose. Jace very narrow, dark grey, proboscis moderately long, bluntly but not shortly conical, with a patch of pale hairs on upper part of dorsal surface. Thorax well arched, shining black, with light short yellowish-grey pubescence and some bristles laterally; scutellum and metanotum shining black. Abdomen shining black, short, contral, very stout, covered rather freely with pale yellowish-grey hairs; venter similar; genitalia imperceptible. Legs bright brownish yellow, wholly clothed with rather copious yellow hairs; the femora broadly black from base to a variable extent, leaving sometimes only the tips pale, tips of tarsi black or blackish. Wings clear, microscopically setulose, highly iridescent; veins yellowish or brownish, halteres small, yellow.

Length,  $2-2\frac{1}{4}$  mm.

Described from several examples in the Indian Museum from Mandalay, 12. in. 1908, type (Annandale), Bangoon, 26. ii, 1908

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(Annandale); Calcutta, 23 x. 1907, Puri, Orissa coast, 24. m. 1908

(Pawa), Monghyr, Bengal, 23. ix 1909 (Jenkins).

These specimens originally recorded as males were really females.

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#### 317. Drapetis fascifemorata, Brun.

Drapetis fascifemorata, Brunetti, Rec Ind Mue ix, p 38 (1913)

Q. Very near *D* brevior, but the 3rd antennal joint is omonshaped and much shorter than in that species. The legs are wholly reddish yellow, with a black streak on the upper side of the femora.

Length, 2 mm

Described from a single 2 in the Indian Museum from

Kurseong, 4 vi. 1908 (Annandale)

This implies have been considered provisionally the Q of D brown as the likeness between the two species is so great, and the difference in colour of the legs might easily be a sexual one only; but the different structure of the antennæ points to its being specifically distinct.

#### 318. Drapetis rotundicornis, Brun. (Pl. IV, fig 25)

Drapetis rotundicornis, Brunetti, Rec Ind. Mus ix, p 38 (1913).

3. Very near D. brevier, from which it differs in the 3rd antennal joint being nearly round, drawn out to a slight point at the tip, from which the long arists projects. The anterior legs are all reddish yellow, the hind femora have the middle part blackish on the upper side.

Length, 2½ mm.

Described from a single of in the Indian Museum from Pari, Orissa coast, 18-19. 1 1908 (Annandale).

In this species again I should have regarded it as a mere variation of brevior but for the different structure of the antennas.

# 319. Drapetis rufipes, Brun.

Drapelis rufipes, Brunetta, Rec. Ind. Mus. ix, p. 38 (1913).

Q. Very near D. brevior. The 3rd antennal joint is obconical, black in colour, with an apical arista. Legs entirely reddish yellow; tips of tarsi brown.

Length, 2 mm.

Described from a 2 in the Indian Museum taken by Dr. Annandale "at light" on board a steamer at Damukdia Ghat, Eastern Bengal, 30. vi. 1908; Madhupur, Bengal, 22. x. 1909 (*Paiva*).

My type specimen is a 2, not a 3, as originally stated.

#### Genus ELAPHROPEZA, Macq.

Elaphropeza, Macquart, Soc. Sci. Lille, p. 86 (1827).

GENOTYPE, Tachydromia ephippiata, Fln. (Europe), by original designation.

Head subspherical, narrower than thorax; eyes large, microscopically pubescent, separated above antennæ in both sexes (frons narrow), or contiguous in both sexes, facets of uniform size; proboscis short, vertical; palpi 1-jointed, broad; antennæ 3-jointed, basal joints short, 2nd rounded, bristly; 3id elongate conical, with long, slightly pubescent, apical arista possessing a microscopic basal joint, epistome short. Thorax subquadrangular, with rounded corners. No distinct dorsal bristles; a notopleural, supra-alar, postalar, and two scutellar bristles; a notopleural supra-alar, postalar, and two scutellar bristles, metapleura bare. Abdomen with last two segments in male hidden by the large genitalia, subcylindrical, in female pointed. Leys slender, fore coix only slightly elongated, fore tibix with short spurs; empodium small, claw-shaped. Wings as in Diapetis.

Range. Europe, India, Ceylon, Java, Papua, Philippines,

Formosa, South Africa, North America, Australia.

Life-history unknown.

This genus is rather easily recognised by the usually yellow and black colour of the species, and the long arists, which is generally bent inwards in the Indian species.

#### Table of Species.

1	Thorax shining black	2.
	Thorax brownish yellow	3.
2.	Basal half of abdomen reddish yellow,	
	apical half black	basalis, Bezzi, p. 384.
	Abdomen wholly black	basalis, Bezzi, p. 384. bicoloripes, Brun., p. 385.
3.	Abdomen practically unicolorous	4.
	Abdomen with basal and apical portions	
	pale, middle part black	5.
4	Abdomen brown, tips of hind tibies,	
	anterior tarsi, and last joint of hind tarsi	
	black	fulvithorax, Wulp, p. 385.
	Abdomen blackish; legs wholly yellow to	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	_tips of tarsi	forruginea, Brun., p. 386.
5	Tarsi and tips of tibiæ brownish	metalarsala, Bozzi, p. 386.
	All legs wholly yellow	variegata, Brun., p. 387.

#### 320. Elaphropeza basalıs, Bezzi.

Elaphropeza basalıs, Bezzi, Ann. Mus. Hung. ii, p. 349 (1904).

"Q. Head rounded, rather brilliantly shining black; occiput with grey tomentum; eyes narrowly separated above antenna, contiguous below them; 3rd antennal joint moderately long, black; arista shorter than antennæ, palpi white. Thorax and scutellum all black, with pale pubescence and bristles. Abdomen as long as thorax, basal half reddish yellow, with rather short pale

pubescence, apical half black. Legs robust, nearly bare, wholly yellow, except the black last tarsal segment, hind tibie with one bristle only and a rather short tooth at tip on inner side, hind metatarsi with short thick pubescence below. Wings short, clear, anterior margin slightly chated; veins pale, 3rd and 4th veins gently diverging; 2nd ending midway between 1st and 3rd, 5th ending at some distance before margin.

"One female, Colombo, 28 11. 1902 (Biró)." (Bezzi )
Type in the Hungarian Museum.

# 321. Elaphropeza bicoloripes, Brun

Elaphi opeza bicolompes, Biunetti, Rec Ind Mus. ix, p. 43 (1913)

Q. Head with eyes absolutely configuous above and below antennæ for the full distance; occiput blackish, with stiff hairs above and softer hairs below, vertex with three whitish ocelli and two long stiff bristles, antennie rather large, basal joints vellowish, wider at tips than bases, 2nd spinose on margin, 3rd brownish, elongate conical, pubescent, with very long arista; proboscis blackish, palpi short. Thorax shining black, lateral margins in front of wing narrowly blownish, dorsum with soit short pale hairs; stiff pre-apical hairs as usual. Scutellum black, shining, with two convergent long apical bristles; sides of thorax black Abdomen shining black, apparently a tendency to a little paleness at base and to dark brown towards tip, very sparsely pubescent, venter similar. Legs brownish yellow; hind temorn (except broadly at base), fore and hind tibize wholly, dark brown. Wings pale yellowish grey, iridescent; venation normal; halteres dirty brown

Length, 14 mm.

Described from a single Q in the Pusa collection from Lower Lebong, 4500 ft., Darjiling Distr., 2-9 vi. 1909 (F. M. Howlett)

# 322. Elaphropeza fulvithorax, Wulp

Elaphropeza fulvithorav, Wulp, Termés Fuzet. xv, p 138 (1857)

Antenno nearly as long as head; basal joints and base of 31d yellow; the latter conical at tip, in front black, arista as long as antenna. Thorax and scutellain yellowish red, very shining; thoracic dorsum arched. Abdomen shorter than thorax, upper surface brown; sides and venter yellow. Legs yellow, tips of hind tibio, the anterior tarsi, and last joint of hind tarsi blackish. Wings distinctly longer than abdomen, brown tinged, especially about middle of anterior border; veins dark; posterior cross-vein also; ultimate portion of 4th longitudinal vein very indistinct; halteres whitsh yellow.

"One male, Kandy, March." (van der Wulp.) Length, 13 mm.

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### 323. Elaphropeza ferruginea, Brun

Elaphropeza ferruginea, Brunetti, Rec Ind Mus ix, p 43 (1913)

d. Head with eyes closely contiguous above and below the antennæ for the whole distance, vertex with three rather large ocelli, occiput light brownish yellow, with numerous stiff bristly hairs above and pale softer hairs on lower part. Antenno with first two joints brownish vellow; 1st much shorter than 2nd. which latter is considerably setose at tip, 3rd joint very elongate conical, blackish, closely pubescent, with long microscopically Proboscis very short, brownish yellow, palpi pubescent arista shorter still, pale yellow, each with a very long bristle wholly brownish yellow, with numerous very short pale yellow hairs and the usual stiff pre-alar bristles, scutellum blackish, with two long bristles, sides of thorax concolorous with dorsum, metanotum blackish. Abdomen blackish, with a very little pale pubescence; ovipositor pale yellow, short. Legs wholly pale brownish yellow from coxe to tips of tarsi Wings pale vellow: halteres pale yellow.

Length, 13 mm

Described from a type of from Lower Lebong, Darpling Hills, 4500 ft., 2-9. vi. 1909 (Howlett), and three other of of from Port Canning, 24. xii. 1907 (Howlett), all in the Pusa collection.

## 324. Elaphropeza metatarsata, Bezzi.

Elaphropeza metatarsata, Bezzi, Ann. Mus. ITung. 11, p. 348 (1904).

" 2. Head roundish, shining black, eyes contiguous below antennæ, separated above by a very narrow space, facets uniform in size; proboscis hardly prominent; palpi yellowish white. Antennæ long, two basal joints yellow, 3rd elongate, acuminate, dark brown, with long, microscopically pubescent, apical arista Ocellar bristles rather long, proclinate; occiput with some small bristles. Thorax shining, with pale pubescence (the bristles in bad condition), a large shining black round spot towards each side near the middle, pubescence all reddish, that below the snot darker; halteres yellow, with dark clubs. Abdomen as long as thorax, with delicate white pubescence, base and tip of abdomen dirty vellow, towards middle shining black Legs all yellow, only the tars and the tibiæ towards taps brownish; hind tibiæ with two bristles only on upper side; hind metatarsi long, narrower than tibie, with a sort of rounded yellow tooth at the base with an isolated rather long bristle behind it Wings pale grey, with a distinct ciliation on anterior margin; 2nd longitudinal vein with tip ending nearer tip of 1st vein than that of 3rd; 3rd and 4th verus parallel; 5th ending at some distance before margin.

"One female, Colombo, 28. 11 1902 (Biró)." (Bezzi.)

Type in the Hungarian Museum.

Bezzi notes that the species is allied to those of his subgenus Ctenodrapetis, from which it is distinguished by the elongate 3rd autennal joint.

### 325 Elaphropeza variegata, Brun.

Elaphropeza variogata, Brunetti, Rec Ind Mus ix, p 42 (1918)

d ♀. Head black, occiput with microscopic pale hairs; eyes contiguous, except for a small vertical triangle which carries the three ocells. Antennæ with first two joints brownish vellow, a tew bristles at the tip of the 2nd; the 3rd elongate conical, blackish, with long pubescent arista. Proboscis short, base much thickened, brownish yellow, palpi much shorter, pale yellow Thorax bright ferriginous, a little blackish about the base of the wings and a thin black median stripe present or absent Scutellum and metanotum concolorous with thoracic doisum. A few lateral bristles on the latter, a few towards the posterior border and two on the scutellum Abdomen with the tip stump-like in d, tapering m 2, dull yellowish on basal and apical thirds, the middle third black, in some examples the basal third is more brownish than Venter similar to upper side; genitalia small, concolorous Legs all yellowish, except for the slightly brown coxe. femora not at all thickened, hind tibic with two long stiff hairs on outer side, placed so as to divide the limb into three equal parts; middle tibix with a long single stiff hair near the tip. Wings pale yellowish grey, 2nd basal cell twice as long as 1st, halteres very pale yellow

Length, barely 2 mm

Described from several 3 3 and 9 9 in the Indian Museum; Calcutta, 5 vii. 1907, type 3 (Annandale), 14. iv. 1909, type 9 (Pawa); other specimens from Calcutta, 13 xiii. 1910 (Kemp), 31. i. 1908, 17 ii 1908, 16. viii. 1907, 2-15. xii 1907; Puri, 18-19 ii 1908; Khurda Rd, Puri Distr., 13. xii. 1910, in train (Kemp), Darjiling, 29. v. 1910 (Brunetti), Paresnath, W. Bengal, 4000 ft., 9 iv. 1909 (Annandale); Parel, Bombay Presid, 26. xii. 1909, Sataia Distr., Bombay 4200 ft., 13-16 iv 1912 (Gravely), Dum-Dum, near Calcutta, 28. vii. 1909 (Lord), Dibrugarh, Assaii, 17-19 vii. 1911 (Kemp).

A very striking and easily recognised species.

# Family LONCHOPTERIDÆ.

Head transverse, as broad as thorax, nearly eval when seen in profile, epistome short, sides bristly; eyes wide apart in both sexes, green in life, from and mouth-border with strong bristles, three ocelli; probose's distinct, thick. Antennæ 3-jointed; first two short, bristly; 3rd rounded, with long 3-jointed subdorsal or apical arista.

Thorax oval or subquadrate, rather flattened, here, except for some bristles; scutellum subtriangular, bare, with two long

bristles.

Abdomen oval, often narrower than thorax, 6-segmented, 1st 2 o 2

segment the longest; bristles present but no pubescence; genitalia in 3 prominent, closely applied to the venter, with two lamelle

Legs rather long, with fine bristles, pulvilli very small, empodia absent.

Wings comparatively long, tip pointed, venation abnormal; auxiliary and 1st longitudinal veins very short; 2nd and 3id veins ending near together towards wing-tip, 4th and 5th united for a considerable distance, 4th vein forked, 6th vein sexually abnormal; anterior cross-vein very near base of wing, oblique; discal cell therefore very long and open (or may be regarded as absent); the two basal cells and the anal cell all very short, subequal; alulæ absent; squamæ very small.

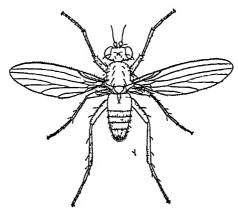


Fig. 37.—Lonchoptera lutea, Panz

Life-history. The larvæ possess a head and ten body-segments, the last one possibly formed of two segments anastomosed; they live in decomposing vegetable matter; metamorphoses unknown. The perfect insects occur on leaves and low bushes, in grass, and near streams.

The affinities of this family have been questioned, but they seem best placed near the Dollohorodide. Only one genus, Loncho ptera, is known. Cadrena, Walk., with one species from Celebes is doubtfully referred to this family.

## Genus LONCHOPTERA, Mg.

Lonchopter a, Meigen, Illig, Mag 1i, p 272 (1803).

Dipsa, Fallen, Specim. entomol p 20 (1810); Dipt. Suoc. Phytom. p 1 (1828).

Lonchopterya, Stephens, Syst. Cat. Brit. Ins. p. 259 (1829).

GENOTYPE, Lonchoptera lutea, Panz. (Europe); by Curtis's designation (1839).

The family characters apply wholly to this genus. The venation possesses the striking character, which is unique throughout the

whole order of the Diptera, of being different in the two sexes, the 6th vein in the 3 running straight to the wing-margin, whereas in the 2 it turns up towards its tip, meeting the 5th vein at some distance from the margin, thus forming a long closed cell.

The species are mainly brown or yellowish in colour and small in size, frequenting hedges, low-growing plants, shady mooks,

grassy fields, and similar situations

Range Europe; the common L. lutea, with some of its varieties, extends to North America and to the East. One species is known from Rhodesia.

Life-history unknown, the larve live in decomposing vegetable matter and have been found under leaves.

### 326. Lonchoptera ? lutea, Panz \*

Lonchopter a lutea, Panzer, Faun Germ. cvnn, pls. 20, 21 (1809), Schiner, Faun Austr 1, p 243 (1862), de Meijere, Tijd v. Ent. xlix, p 64 (1906).

Head yellowish brown, a little paler on underside; eyes and antenne black; ocellar triangle blackish, a row of fine rather weak vertical bristles, 2 post-vertical, all little more than hairs; 1 ocellar, 1 upper fronto-orbital, 1 lower fronto-orbital (near antennæ), all three strong, numerous bristles of different sizes around mouth and lower part of head. Thorax uniformly bright shining brown; a definite though not clearly-outlined median dark stripe from anterior to posterior margin, carried broadly over scutellum to its tip, a pair of very weak bristles or stiff hairs on anterior margin, 4 definite dorso-centrals, 1 on hind corner of dorsum in a line with the hindmost pair of dorso-centrals; 3 supra-alars; 3 or 4 on pleuræ, 1 below humeral region, 1 postsutural, 1 scutellar (apical) Abdomen dark brown, sometimes light yellowish brown at sides towards tip, extreme tip (viewed troin behind) with a small white dot; venter yellowish brown. Legs brownish yellow, extreme tips of tarsi and pulvilli blackish. Wings yellowish, iridescent; venation normal; halteres yellowish. Length, 21 mm.

Described from a of from Coonoor in the Pusa collection,

4.1x. 1911, "sweeping roadside" (Howlett).

In two specimens from Darjiling, 6900 ft., 29. v. 1910 (Brunetti), the back of the head is all yellow, though this character probably has no importance. In one of the specimens the abdomen is yellowish, in the other nearly as dark as in the Coonoor example.

This appears to be the L lutea, Panz., of Europe and other regions, though there are no specimens in good condition for comparison. Dr. de Meijere very kindly at my request sent

<sup>\*</sup> In a comprehensive revision of the European species of this genus Dr de Mujere gives a full list of the varieties and references to this common species. The accepted varieties are cinerca, Meij., flavicauda, Mg, untadfrone, Sirobi, pullistris, Mg., and trilineata, Zett, and the synonyms are numerous, but are not repeated here in case the identification of the species should be an entered.

me out a few from Holland, but they were rendered useless in transit, apparently through the box being opened by the Censor and insecurely re-packed. The only discrepancy between the Coonoor specimen and Verrall's figure ('British Flies,' v, fig. 51, p. 29) is the presence in the former of the bristle near the hind



Fig 38 -Lonchoptera lutea, Panz., Q.

corners of the dorsum of the thorax, in a line with the hindermost pair of dorso-centrals. This bristle is not shown in Verrall's figure

Three other forms of Lonchopter a have come before me, of which one is very striking, but it has unfortunately been accidentally damaged. The wings bear a conspicuous black band. The body is wholly black, the antenne and legs yellow, the fore tibus and tarsi quite black. A single  $\mathfrak P$  from Kumaon in the Pusa collection.

## Family PLATYPEZIDÆ.

Head large; face small, broad, depressed down the middle in both sexes. Eyes bare, large, contiguous for a considerable distance in 3 with enlarged upper facets; wide apart in 2. Antennæ 3-jointed, short; arista long, bare, apical

Thorax subquadrate, somewhat arched, not pubescent, but with a few cheetotactic bristles, which are more distinct in the ?;

pleuræ bare; scutellum with marginal bristles.

Abdomen narrower and generally longer than the thorax; 6- or

7-segmented; genitalia in o more or less incurved.

Legs (except in one non-Oriental genus, Opelia) with hind tibes dilated towards tip, and hind tarsi considerably dilated on first three or four joints

Wings with a characteristic venation, peculiar to this family, auxiliary, 1st, 2nd, and 3rd veins long and nearly straight, 4th vein simple or forked, turned upwards towards tip in Platypeza and ending in wing-margin shortly but distinctly below tip of 3rd vein, so that the 1st posterior cell is always open; 5th and 6th veins straight, simple. Discal cell present or absent; basal cells short; anal cell always longer than 2nd basal, even if only slightly so. Squamæ of moderate size, halteres large.

The females of many species are of quite different coloration from the males, showing conspicuous, brightly-coloured markings

on the thorax and abdomen.

The PLATYPEZIDE form a tolerably compact and limited group of small dark flies, possessing affinities with both the Dolighopodide and Syrphide, being distinguished from the former by the holoptic males and generally increased from tarsi, dull colour, and short, thick-set build, and from the latter by the open 1st posterior cell, absence of the spurious vein and presence of cheetotactic bristles. The peculial bend in the 4th vein in Platypeza is suggestive of the "kink" in the same vein in the Dolighopodide. There seems to be no justification for allying

the PHORIDE with the present group of families

Life-history. The larvæ of very peculial form, amphipneustic, flat, broadly oval, with jointed thread-like processes, the sides of the body sometimes deeply indented and serrate (Callimyia, non-Oriental), the head and next following segment often not visible from above, thus appearing as though only 9 or 10 were present, whereas there are 10 or 11 segments in addition to the head. They live in fungi, especially in species of Boletus, Agaricus, and Lepiota. The pupe are very similar in appearance. The flies frequent low hedges and woods, where they run round quickly in small cricles, varied from time to time (at least in the males) by hovering in the air. Verrall thinks some of the species may be two-broaded, the second one being the more numerous. Only the genus Platifica has been yet recorded from India, but others with less characteristic venation may have been overlooked.

### Genus PLATYPEZA, Mg.

Platypeza, Meigen,\* Klass. Besch. Zweifl. Ins. p. 310 (1804); Brunetti, Rec. Ind. Mus. vn, p. 482 (1912).

(FERGETTE, Platypeza fasciata, Mg. (Europe); by Rondani's designation (1856).

Head large, as broad as thorax; eyes green in life, contiguous in  $\sigma$  for a considerable space, upper facets much enlarged, from in  $\Omega$  about one-fourth of the head; proboscis short, labella broad; palpi wedge-shaped; face small, with distinct raised side margins Antenna small, porrect; 3rd joint a little longer than deep; arista apical, long, bare. Thorax rather oval or subquadrate, moderately arched, bare of pubescence, but with tiny bristles as well as larger chatotactic ones, traces of dorso-contral rows, though very small, except the hinder two or three, which are very distinct, a strong presidural bristle, two or more between the shoulder and the wing-base, a large intra-humeral, and one on the posterior callus; sides bare; scutellum generally with two pairs of marginal bristles. Abdomen longer than thorax, rather flattened, elliptical, more pointed at tip in  $\Omega$ ; 6-segmented in  $\sigma$ , hypopygium incurved;

<sup>\*</sup> Though first described by Mergen in Illig, Mag. u, p 272 (1803), no species was then assigned to the genus.

7-segmented in Q,\* with two-jointed ovipositor; pubescence sparse, especially in Q. Legs normal, hind tarsi with basal joints much dilated; hind tibiæ a little dilated towards tip; middle tibiæ spuired; pubescence slight. Wings proportionately very broad, auxiliary vein ending before middle of wing, 1st, 2nd, and 3rd longitudinal veins slightly sinuous, the last ending near wingtip, 4th vein when near wing-margin bending suddenly upwards at a sharp or reflexed angle (with an appendix at the flexure),† the remaining section curved (the concavity hindwards), ending in wing-margin near tip of 3rd vein, but not meeting it, 5th and 6th veins straight. Three posterior cells; discal cell long, nariow, anal cell shortened, of varying length, always distinctly longer than 2nd basal cell, tip pointed. Anterior cross-vein near base of discal cell; posterior cross-vein near wing-margin. Alulæ rather long; squamæ moderately large; halteres large.

Range. Europe, North and South America, South Africa, and

the Orient.

Life-history Some species live in fungi, especially in Boletus.

#### 327. Platypeza argyrogyna, Meij.

Platypeza a gyrogyna, de Meyere, Tyd. v Ent. 1, p 257 (1907). Platypeza orientalis, Brunetti, Rec Ind Mus vii, p. 481 (1912). Platypeza obscura, Brunetti, loc cit p. 482 (1912) ? Platypeza glaucescens, Walker, Proc. Linn. Soc Lond. iv, p. 117 (1860).

Head in 3 with eyes varying from red to bright or dull brown in the upper facets, lower ones coffee-brown; vertical triangle small, greyish; ocelli very distinct, face greyish or whitish grey; proboscis brownish yellow, with very large labella marked with black; palpi yellow, antennæ brownish yellow, 3rd joint with microscopic whitish pubescence, arista black, yellowish at base;



Fig 39 — Platypeza argyrogyna, Meij., antonna

occiput ash-grey or bluish grey, with minute black bristles. In 9, from about one-quarter of head, with parallel sides, dark brownish grey, with very short yellow hairs; antennal 3rd joint yellowish, often more or less darkened at tip; occlli bright yellow. Thorax

<sup>\*</sup> Exceptionally with only six segments in some European spacies, I Some authors speak of the 4th vein as forked, the lower branch soldom reaching the wing-margin

dull dark greyish brown, sometimes with traces of a darker median stripe; \* frequently the anterior half in o or whole dorsum in Q with a bluish-white shimmer, especially if viewed from behind; shoulders sometimes more or less shining; scutellum sometimes more yellowish. The humeri bear three subequal strong bristles or spines; a few smaller ones above them, two rows of minute dorso-central bristles are traceable, of which only the anterior two or three and the last two in each row are at all conspicuous, the last of all being by far the strongest; a strong bristle on each posterior corner, generally one or more smaller ones in the neighbourhood of the wing-base, and a number of stiff hairs on the dorsum behind the shoulders; scutellum with two pairs of apical bristles. Abdomen normally dull velvet-black, slightly shining in fresh specimens, bare, except for a little pubescence towards the side-margins; a very narrow—often indistinct or absent—greyish band on anterior margins of 3rd, 4th, and 5th segments Legs brownish yellow, femora and tibiæ more or less dark, especially hind pair, which are sometimes dark brown; hind femora rather shining on inner side; first three tarsal joints much widered;

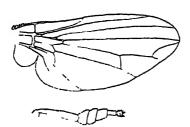


Fig. 40 — Platypeza argyrogyna, Meij, wing and hind leg

hind tarsi in  $\sigma$  golden yellow, with a close row of minute black bristles at sides and along hind margins of each segment, giving the impression of being black-edged; in the Q the tarsi are brown, except the yellow first two joints.† Wings clear, indescent, 1st vein slightly bisinuate, 3rd nearly straight, ending at wing-tip; anterior cross-vein before one-fitth of the discal cell, halteres brownish yellow, clubs more or less dark.

Length, 21-3 mm.

Redescribed from several specimens of both sexes in the Indian Museum, including the types of orientalis and obscura and a named & 2 sent from Java by de Meijere. Kurseong, 5000 ft., 4. vii. 1908, type & and 2 of obscura (Annandale); Sukna, E. Himalayas, 500 ft., 1. vii. 1908 (Annandale); Almora, Kuinaon, 5500 ft., 20-21. ix. 1911 (Paiva), Pusa, 11 vii. 1913, 23 viii. 1913, 14. ix. 1914; Calcutta, 18. vii. 1908 (Annandale); Bangalore, S. India,

<sup>\*</sup> According to de Meijere; I have not found it so myself.
In my obscura the tarsi are wholly brownish in both sexes.

3000 ft., 16 x. 1910 (Annandale); Perademya, Ceylon, vn. 1919;

Sadiya, Assam (type of orientalis).

There can be no reasonable doubt of the synonymy of my orientalis, and arginogyna is also probably a synonym of glaucescens, Walker, but of this latter there is probably no specimen in existence, so de Meijere's name will presumably stand good. The sole difference between his species and Walker's is the black dot on the front of the head referred to by the older author, which seems a small matter in a "piceous black" species. P. glaucescens was described from Macassar, Celebes As regards my obscura, it may be ranked for the present as a variety without any tince of shimmer on the thorax, and with the tarsi nearly uniformly brownish in both sexes



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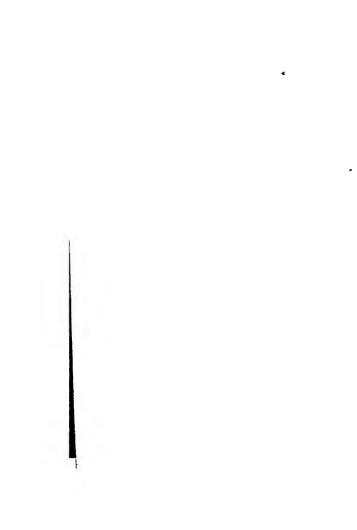
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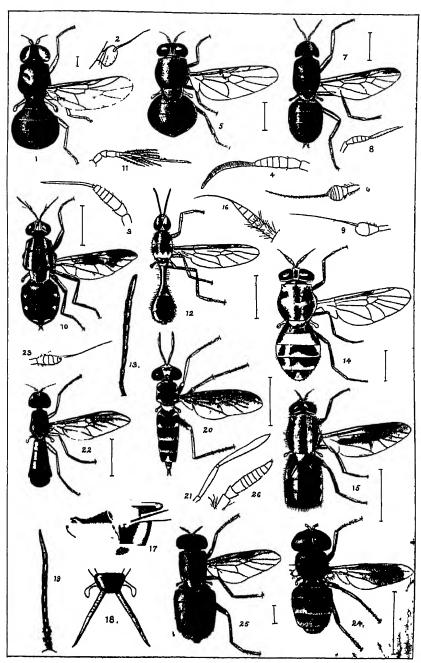
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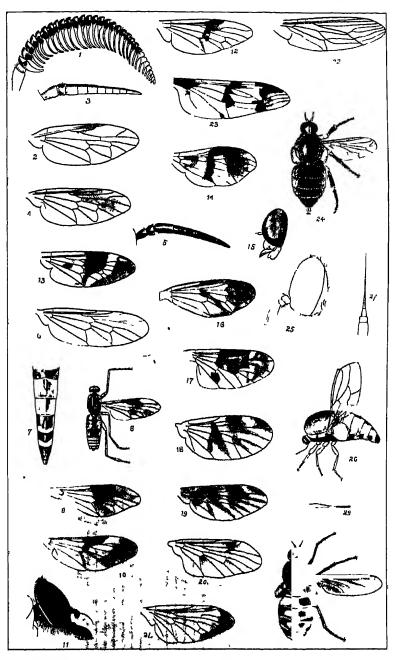
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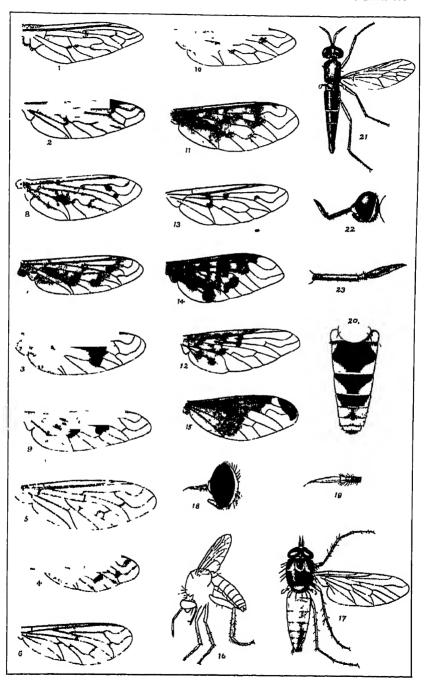
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